The
Electrical Review

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The Value of the B.I.F.

ALTHOUGH any suggestion that there is likely to be a slump (or "recession" to use the American euphemism) in the immediate future is frowned upon, it cannot be denied that it is necessary to do all that can be done to maintain and stimulate industry and export trade.

That is the principal reason why we give all possible support and encouragement to the British Industries Fair and why the leading manufacturers of the country consider it worth while to take space in London and Birmingham year after year. The effort is a real one for many of them have to go to the trouble of staging exhibits of heavy plant for a period of less than a fortnight. This is sound evidence of the value of the Fair to British industry in securing business from home and overseas buyers.

The evolution of the Fair is an interesting study. In its origin it was closely bound up with the war-time exhibits of foreign articles which were no longer obtainable and which British manufacturers were urged to replace with their own products. Then after the war, when the need for the restoration of our foreign markets was imperative, it provided a means by which buyers from abroad could see what our factories were capable of producing. This remained its principal function for a number of years and ostensibly it is so still.

There is no doubt, however, that it is of equal importance to the home buyer. In no other way can he see gathered together in one building such a comprehensive range of engineering and allied products as that arranged at Birmingham; or in their own different fields such displays of lighter goods as those at Olympia and Earls Court.

Moreover, the Fair provides an opportunity to manufacturers to see what developments are taking place in other branches of British industry, giving them many useful ideas. Indeed, we have heard of visitors actually discovering departures in their own branch of which they were not previously aware.

The Electrical Section at Birmingham continues to increase in importance, to the great credit of the Electrical Advisory Committee. This year there is again a remarkably strong display in which a number of new concerns are represented.

As usual, there will be a number of electrical functions at the Birmingham section and particulars of these are given on page 223. More than usual interest attaches to the speeches this year. It will be seen that two of these will be delivered by leaders of the two divisions of the electricity supply industry—Mr. W. B. Woodhouse (Yorkshire Electric Power Co.), for the companies, and Mr. J. N. Waite (city electrical engineer, Hull), for the municipalities.

The principal speaker at the electrical luncheon on March 1st will be Mr. Leslie Burgin, the Minister of Transport. It is probable that, having been acquainted with the views of the before-mentioned speakers, he may be impelled to lift a corner of the veil which now shrouds the Government's intentions towards the supply industry.

BRITISH INDUSTRIES FAIR

A survey of the industrial and domestic products shown at Birmingham, prepared by our Staff representatives, will appear in next week's

"ELECTRICAL REVIEW"

Readers visiting Castle Bromwich are invited to call at our stand, No. Cb. 218.

Anglo-American Negotiations

LORD HIRST, the president of the Federation of British Industries, with Mr. Peter Bennett, deputy president, recently interviewed the President of the Board of Trade to impress upon him the desirability of consulting those industries likely to be affected by a trade agreement with the United States before making any tariff concessions. Mr. Stanley assured them that information which he had received and inquiries which he had made had given the Government complete knowledge of the circumstances and views of every industry likely to be affected in any way. In a letter summing up the results of the interview Lord Hirst still maintains that the appropriate trade associations should be given an opportunity of expressing their views. He says that whatever other sources of information the Minister may utilise it is through the trade association representing an industry that the views of an industry as a whole can best be obtained. He therefore asks that the Minister shall take such associations into his confidence—a request that appears to be quite a reasonable one coming as it does from such a responsible quarter.

Use More Films

WE have always maintained that our industry has not used the cinema film to anything like the extent which its qualities merit. No doubt many praiseworthy efforts have been made and are being made, but the scope is still enormous. It is not only the lay audience which should be aimed at, although from the revenue aspect this is the most fruitful. Even technical or semi-technical audiences would benefit by more frequent film demonstrations. The medium was successfully used at last year's A.P.L.E. Conference by Messrs. T. Catten, R. Maxted and G. S. C. Lucas in conjunction with their paper on planned street lighting. The latest examples of the art are being shown at I.E.E. Centres by Dr. A. P. M. Fleming to illustrate his Faraday Lecture. Three films are used: one shows the discoveries of Faraday's predecessors while another deals with the work of Faraday himself. A third is a cartoon film illustrating electric breakdown phenomena. Dr. Fleming is also using a number of lantern slides which add to the interest and understandability of his lecture.

A Special Case

PROGRESS with the electrification of the Southern Railway has received a slight setback. The company announced last week-end that it had decided not to proceed yet with the conversion of the Sevenoaks-Hastings (*via* Tunbridge Wells) line. The reasons given are both economic and technical. When the work was scheduled to the 1935 Railways (Agreement) Act, which provided for the raising of money on favourable terms, it was intended that the line should be included with another section. The latter section, it was found, could better be dealt with by itself, and so the advantages of converting the Hastings line disappeared. Since the Act was passed costs of labour and material have risen which still further militates against economic conversion. In addition to this the line has a restricted loading gauge which necessitates special rolling stock and the directors refer also to other adverse factors of a technical nature. It will be seen that the case for electrification, as such, is not invalidated by the company's decision and it is to be hoped that when conditions are more favourable the good work of the Southern will go ahead.

Air Conditioning in Australia

AN electrical industry which is in its infancy in Australia is air conditioning, and a correspondent informs us that a number of stores are now having their premises equipped with this type of plant. Manufacturers of air-conditioning plant should bear the Australian market in mind, for the equipping of a transcontinental express train has secured much publicity, and our correspondent anticipates that a great deal will be done in this way within the next two or three years.

Magnetic Values

EXPERIMENTS carried out by Dr. T. F. Wall and communicated by him to *Nature* appear likely to have a definitely practical bearing, besides raising a question as to whether their interpretation may not call for some modification of generally held theories of magnetism. His tests imply not only that an increase of permeability reduces iron losses for a given induction density and also the magnetising current required, but in addition that a strengthening of the magnetisation curve near the origin eliminates to that extent higher harmonics in the magnetising current of a transformer—a problem to which some prominence was given at the V.D.E. Conference last August. The particulars given on a later page indicate that for the correct appreciation of values in tests on magnetic material, the cross-sectional area of the sample must be stated.

Trunk Road Lighting

ADEQUATE lighting of the whole length of main traffic routes between urban centres is long overdue. It could be done, we believe, for about £500 to £600 per mile per annum, which is only a small proportion of the total cost of the road charges. Nevertheless, any proposals to reduce the cost without sacrificing adequate illumination are to be welcomed. At the annual dinner of the I.E.E., the President (Sir George Lee) gave a lead by suggesting that lamps might be switched on by the vehicles themselves passing over road contacts. The chief difficulty in making this idea immediately realisable is the time taken by discharge lamps (which have come to stay) to reach full brilliance, as the contacts would have to be several miles in advance of the section they controlled in order to have the lamps in operation by the time a fast-moving vehicle reached them. While conditions may not at present be favourable to such a scheme of automatic control, it may confidently be said that finality has not yet been reached.

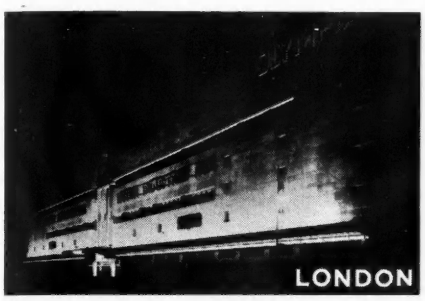
The Smaller Undertakings

AT a meeting held last week the Executive Committee of the Committee of Smaller Municipal Electricity Supply Undertakings reaffirmed its previous decisions to oppose any Bill for the compulsory amalgamation or absorption of efficient undertakings, and to co-operate in any measure for the standardisation of tariffs, voltages, etc. The opinion was reiterated that there was no justification for any revolutionary proposals, and that most of the McGowan Committee's recommendations could be achieved without existing undertakings losing their identities. Provisional arrangements were made for the organisatioin of protest meetings by local authorities in the event of any Bill which makes provision for the compulsory amalgamation or absorption on a large scale of existing undertakings. The question of a postcard bombardment of M.P.s was deferred for further consideration.

Gas Lamp Lumens

A CONTROVERSY that arose at the Public Lighting Conference last September has been settled as a result of tests carried out at the National Physical Laboratory at the instance of Mr. W. J. Jones, manager, E.L.M.A. Lighting Service Bureau, and Mr. K. F. Sawyer, of the Gas Light and Coke Co. Mr. Jones had challenged the claim made by the gas people that 350 lumens were obtainable per cu. ft. of gas per hour when using high-pressure lanterns. Tests on a single-light fitting showed an initial output of 327 lumens per cu. ft. of gas having a calorific value of 500 B.th.u. per cu. ft., which is reasonably close. Luminous output was considerably reduced when more than one burner was employed, due to the masking effect of additional ones, being only 260 lumens for a three-light fitting. It is fair to state, however, that the three-light high-pressure lamp is installed only in exceptional cases, and will be even less common in the future as the use of electricity for street lighting in large towns is extended.

BRITISH INDUSTRIES FAIR



FEBRUARY 21ST to MARCH 4TH

More electrical exhibitors than ever will participate in this year's exhibition which opens on Monday, and there will be an exceptionally large amount of new apparatus making its first appearance

WITH every successive year the British Industries Fair becomes more and more an electrical exhibition. Not only do an increasing number of the stands bear items of electrical interest, but the wider applications of electricity are resulting in considerably greater attention being paid to electrical products by persons and bodies outside the electrical industry proper.

It is perhaps the very diversity of the interests catered for that has enabled, and, it is hoped, will continue to enable, the Fair to render such valuable service both to manufacturers and buyers in making known to as many persons as possible the latest facilities which electricity has to offer them.

Apart from the various electrical associations, comprising the electricity supply authorities, wholesalers and contractors, all of whom give active support to the exhibition, there are several other bodies who are all more or less concerned with the doings of the electrical industry and are anxious to acquaint themselves with the latest developments. The official visits which have been planned will enable representatives of chambers of commerce, export merchants, architects, builders' merchants, heating and ventilating engineering employers, ironmongers, purchasing officers and sales managers, not to mention gas engineers, to learn what electrical manufacturers have been doing since last February.

When the doors of the Fair open next Monday there will be somewhere about two hundred and fifty stands containing electrical and allied exhibits to be visited at Castle Bromwich (Birmingham) alone, as well as approximately eighty at Olympia and a few extra ones at Earls Court.

To assist visitors to find their way about the 302,000 sq. ft. of display space taken by exhibitors at Castle Bromwich—this, incidentally, is the largest area ever booked there—we reproduce on the next page a plan of the Electrical Section where most of the electrical exhibits are to be found. A key to the stand numbers appears on the page facing the plan, where the complete list of electrical exhibitors both at Birmingham and London is given.

What the "Review" is Doing

If in spite of this assistance visitors lose their bearings, a call at the ELECTRICAL REVIEW stand, Cb218, will enable us to put them on the right track again. Lost or not they will be welcomed by our staff representatives who will be in attendance to render any service within their power both to exhibitors and buyers.

On page 226 and the following pages we give brief descriptions, together with illustrations, of all the exhibits of electrical interest. By glancing through these beforehand, visitors, especially those with limited time at their disposal, will be able to make a note of any items which they particularly want to see and plan their tours accordingly. Furthermore, those who are unable to go to the Fair will, we hope, find our notes, as well as the reviews of the equipment given by our staff in next week's issue, helpful in following developments.

As already mentioned, most of the electrical equipment exhibits, both industrial and domestic, will be found at Castle Bromwich. In London, however, there will be an excellent opportunity of seeing many of the smaller domestic appliances. There will be particularly good displays of electric lighting fittings and vacuum cleaners at Olympia, where other electrical products well represented will include home laundry equipment, clocks, radio and television apparatus, plastics, chemicals required in the electrical industry, and such articles as electric heating pads, razors and health appliances.

The Fair will be open each day (except Sunday) from 10 a.m. to 6 p.m. at Castle Bromwich and from 9.30 a.m. to 7.30 p.m. in London until Friday, March 4th.

The body responsible for the organisation of the Electrical Section at Castle Bromwich is the Electrical Advisory Committee, consisting of the following representatives of the industry:—Mr. A. Albrecht, director and secretary, E.W.F.; Mr. W. J. Bache, president, I.M.E.A.; Mr. E. G. Batt, chairman, Heating and Cooking Section of B.E.A.M.A.; Mr. H. H. Berry; Mr J. R. Cowie, A.M.E.E.; Mr. A. C. Cramb, director, E.D.A.; Mr. H. M. Fulton, president, E.C.A. of Scotland; Lt-Col. W. J. Kent, Electrical Porcelain Manufacturers' Association; Sir George Lee, President I.E.E.; Mr. T. R. Martin, hon. secretary; Dr. A. H. Railing; Mr. C. W. Sully, director, E.L.M.A.; Mr. H. E. Walker, president, E.C.A.; Mr. V. Watlington, director, B.E.A.M.A.

Electrical Functions

This Committee has made the following arrangements for official visits to Castle Bromwich by various associations:—

Tuesday, February 22nd (1 p.m.)—Luncheon.
Institution of Electrical Engineers (South Midland Centre).
Incorporated Municipal Electrical Association (Provincial Centres).
British Electrical Development Association (Provincial).
Association of Supervising Electrical Engineers.
Association of Steel Conduit Manufacturers.
Tramways, Light Railways & Transport Association.
Illuminating Engineering Society.
Electrical Contractors' Association, Inc. (Provincial).
Electrical Wholesalers' Federation (Provincial).
Association of Mining Electrical Engineers.

Speaker: Mr. W. B. Woodhouse, managing director, Yorkshire Electric Power Co.

Thursday, February 24th (4.15 p.m.)—Tea.
Electrical Association for Women (Birmingham and Midlands Branch).

Saturday, February 26th (1 p.m.)—Luncheon.
Electrical Power Engineers' Association.
Electrical Association for Women (Demonstrators' Circles).

Speaker: Mr. J. N. Waite, city electrical engineer and manager, Hull.

Saturday, February 26th (4 p.m.)—Tea.
Students' Section of the South Midland Centre of the Institution of Electrical Engineers.

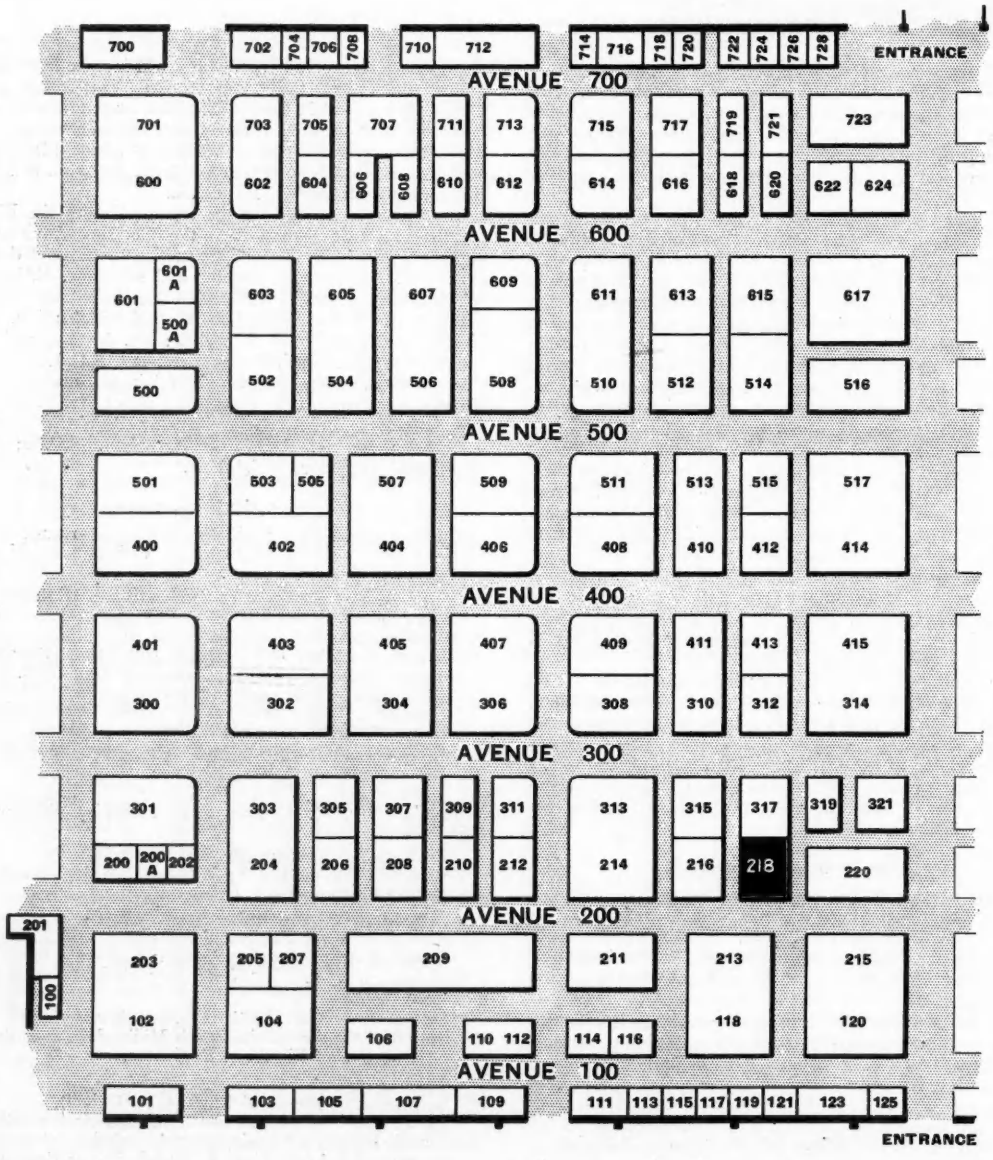
Tuesday, March 1st (1 p.m.)—Luncheon.
Institution of Electrical Engineers (Council).
Incorporated Municipal Electrical Association (Council).
British Electrical Development Association (Council).
Incorporated Association of Electric Power Companies.
Provincial Electric Supply Association.
London Electricity Supply Association.
Electrical Contractors' Association of Scotland.
British Electrical and Allied Manufacturers' Association (Council).
Electrical Contractors' Association, Inc. (Council).
Electrical Wholesalers' Federation (Council).

Speaker: Mr. E. Leslie Burgin, Minister of Transport.

The ELECTRICAL SECTION at Birmingham

(ELECTRICAL REVIEW Stand No. Cb. 218 shown black)

The main avenues are distinguished by coloured lighting as follows:—700, pink; 600, green; 500, orange; 400, white; 300, red; 200, purple; and 100, yellow.



List of Exhibitors

BELOW we give a list of exhibitors of electrical and allied products at both the Birmingham and London Sections of the Fair. Most of the Castle Bromwich (Birmingham) exhibitors mentioned below will appear in the Electrical Section (Cb), a plan of which appears on the opposite page, but others will be found in the Hardware (A), Building (B), Gas (Ca) and Engineering (D) Groups. Apart from the few Earls Court stands indicated all the London exhibitors will be at Olympia.

Birmingham

Accles & Pollock, Ltd. ... ... D 510 & 611
Aeraspray Mfg. Co., Ltd. ... ... D 720
Aiton & Co., Ltd. ... ... D 735
Aladdin Industries, Ltd. ... ... B 417
Allday, Wm., & Co., Ltd. Ca607
Allen, Edgar, & Co., Ltd. ... ... D 719
Allied Electrical Finance Corporation, Ltd. Cb200a
Altendorf & Wright Cb708
Arrow Electric Switches, Ltd. ... Cb311
Associated Electric Vehicle Mfrs., Ltd. Cb502 & 603
Avery, W. & T., Ltd. ... ... D 412 & 515
Avery-Hardoll, Ltd. ... ... D 412 & 515
Babcock & Wilcox, Ltd. ... ... D 300 & 401
Bakelite, Ltd. Cb408
Baldwins, Ltd. Cb312
Banking Facilities Trust, Ltd. ... Cb200a
Bank HardwareMfg. Co., Ltd. ... A 228 & 333
Barrett & Elers, Ltd. Cb720
Barronia Metals, Ltd. ... ... D 325
Beatty Brothers, Ltd. ... ... B 632 & 719
Becker, F. E., & Co. ... ... B 411
Beetle Products Co., Ltd. ... ... Cb504 & 605
Belling & Co., Ltd. Cb308
Belling & Lee, Ltd. Cb702
B.E.N. Patents, Ltd. ... ... B 629
Berry's Electric, Ltd. Cb209
Best Products, Ltd. Cb704
Birkenhead Corporation Cb613
Birmingham Battery & Metal Co., Ltd. D 506 & 607
Birmingham Electric Furnaces, Ltd.... Cb214 & 313
Birmingham Electric Supply Dept. ... Cb406
Black & Decker, Ltd. ... ... Cb410 & 513
Blackwell, W., Oil Co. Cb201
Bowker, S. O., Ltd. Cb317
Bowmaker, Ltd. Cb200a
Bratt Colbran, Ltd. Ca604
Bray, Geo. & Co., Ltd.... ... ... Cb305
Britannia Batteries, Ltd. Cb503
Britannia Electric Lamp Works, Ltd. A 513
Britannia Tube Co., Ltd. ... ... D 510 & 611
British Electric Domestic Appliances, Ltd. Cb713
British Electrical Development Association, Inc. ... ... Cb306 & 407
British Emulsifiers, Ltd. ... ... A 524
British Industrial Plastics, Ltd. ... Cb504 & 605
British Oxygen Co., Ltd. ... ... D212, 312 & 411
British Sangamo Co., Ltd. ... Cb402
British Thermostat Co., Ltd. Cb700
British Thomson-Houston Co., Ltd. ... Cb404 & 507
British Trane Co., Ltd. ... ... B 323
British Vacuum Cleaner & Engineering Co., Ltd. Cb205
Brockhouse Heater Co. ... ... Ca606 & 709
Brooke Tool Mfg. Co., Ltd. ... ... D 625
Brooks, J. B., & Co., Ltd. ... ... B 408 & 509
Broughton, J. Cb600
Bulpitt & Sons, Ltd. ... ... A417 & Cb514
Buroo, Ltd. Cb315
Bylock Electric, Ltd. Cb724
Cable Makers' Association ... ... Cb300 & 401
Canadian Government Exhibition Commission B 632 & 719
Canning, W., & Co., Ltd. ... ... Cb120 & 215
Cardiff Corporation ... ... A 508 & 609
Carron Company Cb723
Carter & Co. (Nelson), Ltd. Cb714
C.A.V.-Bosch, Ltd. Cb501
Cellactite & British Uralite, Ltd. ... B 522 & 625
Cellon, Ltd. ... ... B 529
Clarkson Thimble Tube Boiler Co., Ltd. D 300 & 401
Clayton, Son & Co., Ltd. Ca403
Chloride Electrical Storage Co., Ltd.... Cb307
Coleman & Appleby, Ltd. Cb216
Commutator Grinding Block Co. ... Cb728
Concordia Electric Safety Lamp Co., Ltd. Cb505
Constructors, Ltd. ... ... Cb506 & 607
Corfield-Sigg, Ltd. ... ... Cb414 & 517
Cotto Products ... ... A 326
Coventry Refrigerator Co., Ltd. ... Cb718
Crockatt, W., & Sons ... ... D 718a
Crumblehulme, Ltd. ... ... B 500 & 601
Daniels, T. H. & J., Ltd. Cb125
Desoutter Bros., Ltd. ... ... Cb118 & 213
Diamond H Switches, Ltd. Cb512
Dick, R. &. J., Ltd. ... ... D 213
Dominion Machinery Co., Ltd. ... B 325
Donovan Electrical Co., Ltd. Cb309
Drew, Clark & Co. ... ... A 232
Driver, W. T. Cb111
Dyson (1929), Ltd. Cb724
Earle, Bourne & Co., Ltd. ... ... D 500
Eaves, Thomas, Ltd. Cb302
ELECTRICAL REVIEW **Cb218**
Electricars, Ltd. ... ... Cb502 & 603
Electrona Electrical Products, Ltd. ... B 211
Elkington & Co., Ltd. ... ... D 507
Elliott, E., Ltd. Cb413
Enfield Rolling Mills, Ltd. ... ... D 224 & 321
English Electric Co., Ltd. ... ... Cb510 & 611
Ether, Ltd. Cb716
Evenlite Tube Lamp Development, Ltd. Cb114
Fastnut, Ltd. ... ... B 209
French, W. T., & Son ... ... A 433
Gascoignes (Reading), Ltd. ... ... D 707
General Electric Co., Ltd. ... ... Cb414 & 517
Gent & Co., Ltd. Cb515
George, W. &. J., Ltd. ... ... B 411
Gilman, F. (B.S.T.) Ltd. Cb516
Girdlestone & Co. ... ... D 323
Gittings & Hills, Ltd. ... ... B 324
Gordon, James, & Co. Cb716
Greenwood & Batley, Ltd. ... ... D 214 & 313
Grosvenor Utilities, Ltd. Ca712
Guest, Keen & Nettlefold, Ltd. ... B 524
Guests Brass Stamping Co. ... ... D 533
G.W.B. Electric Furnaces, Ltd. ... Cb204 & 303
Hague & McKenzie, Ltd. Cb400
Halden, J., & Co., Ltd. Cb206
Harper, J., & Co., Ltd. Cb601
Harvey, G. A., & Co. (London) Ltd. ... B 329
Hawkes, O. C., Ltd. ... ... B 412
Hawkins, L. G., & Co., Ltd. Cb609
Heayberd, F. C., & Co. Cb620
Hendon Chemical Co. Cb208
Herbert, Alfred, Ltd. ... ... D 304 & 309
Higgs Motors, Ltd. Cb617
Holden & Hunt ... ... Cb602 & 703
Hotpoint Electric Appliances Co., Ltd. Cb509
Hufton, Chas., & Sons, Ltd. ... ... A 414
Hurley Machine Co., Ltd. ... ... B 632 & 719
Hyders Cb722
I.C.I., Ltd. (Degreasing) ... ... D 305
I.C.I., Ltd. (Heat Treatment) ... D 206
I.C.I. Metals, Ltd. ... ... D 302 & 403
International Combustion, Ltd. ... D 114 & 215
International Refrigerator Co., Ltd.... Cb614
Ioco Rubber Waterproofing Co., Ltd.... ... ... Cb624
Jackson Electric Stove Co., Ltd. ... Cb409
Jiffy Automatic Clothes Washer Co.... A 527
Johnson, Matthey & Co., Ltd. ... Cb211
Kaufmann, H. ... ... A 506 & 607
Kitchendom, Ltd. ... ... A 600
Knightshades, Ltd. Cb207
Lacrinoid Products, Ltd. ... ... A 526a
Lan-Bar, Ltd. ... ... A 425
Landale & Co. ... ... B 213
Ley's Malleable Castings Co., Ltd. ... D 402 & 503
Lister, R. A., Ltd. ... ... D 204
London Aluminium Co., Ltd. ... ... A 310 & 411
London Elec. Wire Co. & Smiths, Ltd. Cb612
London Wire Co., Ltd.... ... ... A 426
Lucas, Joseph, Ltd. Cb501
Lusty, W., & Sons, Ltd. ... ... A 622
MacGregor & McCullum, Ltd. ... B 632 & 719
Macpherson, Donald, & Co., Ltd. ... B 527
Mansions Motor Co., Ltd. ... ... D 708
Martindale Electric Co., Ltd. Cb606
M.C.L. & Repetition, Ltd. ... ... D 406
Metalectric Furnaces, Ltd. ... ... D 502 & 603
Metlex Industries, Ltc. ... ... A 322
Metropolitan-Vickers Electrical Co., Ltd. Cb220
Midland Fan Co., Ltd. ... ... A 614
Midland Metal Spinning Co., Ltd. ... A410 & Cb202
Midland Vehicles, Ltd. Cb108
Mirrlees, Bickerton & Day, Ltd. ... B 322
Mirrlees, Watson Co., Ltd. ... ... B 322
Modern Products (L.C.L.), Ltd. ... Cb711
Moffats, Ltd. Cb511
Morecambe Electrical Equipment Co., Ltd. Cb710
Morrison, A. E., & Sons, Ltd.... ... Cb502 & 603
Moseley, David, & Sons, Ltd.... ... D 630
Moss Gear Co., Ltd. ... ... D 420
National Time Recorder Co., Ltd. ... Ca205
Neill, James, & Co. (Sheffield), Ltd.... D 527 & 529
Newall's Insulation Co. ... ... D 521
Omes, Ltd. ... ... D 724
Orme, Evans & Co., Ltd. Cb500
Osborn Mfg. Co., Ltd. Cb616
Ozalid Co., Ltd.... ... ... Cb707
Packless Gland Co. Ltd. Cb700
P. B. Sillimanite Co., Ltd. Cb622
Perkins Clean Milk Equipment, Ltd.... A 625
P. &. H., Ltd. Cb501
Philips Industrial Cb712
Pinchin, Johnson & Co., Ltd. ... B 516 619
Poles, Ltd., ... Cb506 & 607
Power Centre Co., Ltd. Cb618
Pyrotenax Ltd. Cb112
Rapid Magnetting Machine Co., Ltd.... Cb412
Rawlplug, Ltd. Cb210
Redfern's Rubber Works, Ltd. ... D 210
Redmanol, Ltd. Cb408
Revo Electric Co., Ltd. ... ... Cb304 & 405
Revvo Castor Co., Ltd. ... ... D 331
Rheostatic Co., Ltd. ... ... Cb310 & 411
Robbins & Bradley Cb500a
Rotax, Ltd. Cb501
Rowlands Electrical Accessories, Ltd. Cb106
Rubery, Owen & Co., Ltd. Cb705
Rudd, E., & Co., Ltd. Cb200
Runbaken Electrical Products ... Cb100
Ruston & Hornsby, Ltd. ... ... D 407
Sankey, Jos., & Sons, Ltd. ... ... A412 & B513
Scottish Development Council ... A 530
Sellman & Hill, Ltd. ... ... A 202 & 307
Sichel, O., & Co. Cb711
Simmonds Aerocessories, Ltd. ... D 421
Simmons Holloware Co., Ltd. ... A 300
Simplex Electric Co., Ltd. ... ... Cb314 & 415
Small, W. R., Ltd. Cb706
Smellie, James, Ltd. ... ... B 519
Smith, Frederick, & Co. Cb612
Smith Meters, Ltd. ... ... Cb102 & 203
Standard & Pochin Bros., Ltd. ... B 420
Steam Gauge Mfg. Co., Ltd. ... ... D 712
Stewarts & Lloyds, Ltd. ... ... D 400 & 501
Stirling Boiler Co., Ltd. ... ... D 300 & 401
Streetly Mfg. Co., Ltd. ... ... Cb504 & 605
Strong & Co. Cb615
Summerscales, W. & S., & Sons ... A 519
Sutherland Meter Co., Ltd. Ca208
Tarpen Engineering Co., Ltd. ... Cb726
Taylor, Chas. (Birmingham), Ltd. ... D 717
Taylor & Challen, Ltd.... ... ... D 409
Taylor, Taylor & Hobson, Ltd. ... D 714
Tecalemit, Ltd. ... ... D 316 & 415
Telegraph Construction & Maintenance Co., Ltd. Cb403
Terry, Herbert, & Sons, Ltd. ... ... B 424
Thomas, Bertram Cb321
Thompson, J. (Wolverhampton), Ltd. D 606 & 709
Timmis & Co., Ltd. Cb601a
Titanine, Ltd. Cb208
Tube Products, Ltd. ... ... D 517
Tubes, Ltd. ... ... D508 & 609
Turners' Asbestos Cement Co.... ... Ca301
United Steel Coys., Ltd. ... ... D 512 & 613
Vacuum Oil Co., Ltd. ... ... D 419
Van Dorn Electric Tools ... ... Cb410 & 513
Vent-Axia, Ltd., ... B 706
Vulcanised Fibre, Ltd. ... ... D 207
Waddicor (Bradite), Ltd. Cb719
Wakefield, C. C., & Co., Ltd. Cb301
Walker, Jas., & Co., Ltd. ... ... D 620
Walmsley Patent Lamp Co., Ltd. ... Cb721
Ward, H. W., & Co., Ltd. ... ... D 315
Westinghouse Brake & Signal Co., Ltd. Cb508
Whittaker Bros. (Accrington), Ltd. ... A 314
Wilcox & Pitman ... ... A 408
Wild-Barfield Elec. Furnaces, Ltd. ... Cb204 & 303
Wilkins & Mitchell Cb604
Williams (Birmingham), Ltd.... ... A 312 & 413
Williams, John, & Sons (Cardiff), Ltd. D 526
Winston, Thos., Ltd. ... ... A 404
Wolseley Sheep Shearing Machine Co., Ltd. ... ... D 705
Worksop Corpn. Elec. Dept. ... ... Cb715 & 717
Yorkshire Copper Works, Ltd. ... B 630 & 717
Young Accumulator Co., (1929) Ltd.... Cb608

London

A.B.E.C., Ltd. ... ... D 1151
Air-Glow Lights, Ltd. ... ... C 1039
Aladdin Industries, Ltd. ... ... F 1362
Allen & Hanburys, Ltd. ... ... A 642 & 644
Alter, Henry J. ... ... D 1106
Amplivox, Ltd. ... ... A 663
Anstey & Wilson, Ltd. ... ... E 1209
"Ardente," Ltd. ... ... A 655 & 661
Ashdown, H. E. (Birmingham), Ltd.... A 677
Baird Television, Ltd. ... ... A 709
Bakelite, Ltd. ... ... A 684
Baker, Charles ... ... A 635 & 651
Baker Platinum, Ltd. ... ... E 1213
Barr & Stroud, Ltd. ... ... A 614
Beck, R. & J. ... ... A 636 & 650
Belgrave Electric Co., Ltd. ... ... F 1306
Bentima Co., Ltd. ... ... D 1145
Binger, O. D. (Sales Aids), Ltd. ... D 1122A
British Alabaster & Arts Co., Ltd. ... F 1395
British Elec. Domestic Appliances, Ltd. G 1526
British Plastics Federation, Ltd. ... A 711
British Vacuum Cleaner & Engineering Co., Ltd. ... ... D1139 & G1523
Brook, J. A., Ltd. ... ... 'E 1207
Burton Holt (Chelsea), Ltd. ... ... F 1330
Butler, George (Dudley), Ltd. ... Earls Court 439
Bylock Electric, Ltd. ... ... G 1528
Catalin, Ltd. ... ... A 683
Cole, E. K., Ltd. ... ... A 702
Cook, T. P., & Co. (Sales), Ltd. and Earls Court ... F 1416 187
Daniels, T. H. & J., Ltd. ... ... A 682
De la Rue, Thomas, & Co., Ltd. ... A 696 & 704
Dent, R. H., Ltd. ... ... A 655 & 661
Dernier & Hamlyn, Ltd. ... ... F 1401
Dictograph Telephones, Ltd. ... ... F 1324
Dominion Electrical Co. ... ... C 1036
Doughty, J. M., & Sons, Ltd.... Earls Court 169
Ebonestos Insulators, Ltd. ... ... A 697
Edgware Shade Co. ... ... F 1308
Electric Art Shades (1928), Ltd. ... F 1437
Elliott, F. W., Ltd. ... ... D 1144
Elliott & Spear, Ltd. ... ... F 1365
Enfield Clock Co. (London), Ltd. ... D 1137
Foster, A. E. ... ... F 1334
Garrard Clocks, Ltd. ... ... D 1143
General Chemical & Pharmaceutical Co., Ltd. ... ... A 692
G.M.C. Mouldings, Ltd. ... ... A 700
Grimshaw, Baxter & J. J. Elliott, Ltd. D 1148
Hanovia, Ltd. ... ... A 656 & 660
Hilger, Adam, Ltd. ... ... A 613
Hoover, Ltd. ... ... G 1525
Hughes, F. A., & Co., Ltd. ... ... A 703
Ideal Home Electrical Appliances, Ltd. A 657
Imperial Chemical Industries, Ltd. ... A 612 & 626
Injection Moulders, Ltd. ... ... A 679
Insulators, Ltd. ... ... A 698
Jaffe & Rose ... ... F 1328
Johnson, Matthey & Co., Ltd. ... E 1240
Kent Mouldings... ... ... A 701
K.F.M. Engineering Co., Ltd. ... D 1135
Leek, E. & J., Ltd. ... ... E 1236
London Electric Clock Co. ... ... D 1138
Mallinson & Eckersley, Ltd. ... ... F 1303
Mayfair Shades, Ltd. ... ... F 1430
Mouldrite, Ltd. ... ... A 676 & 685
National Clock Mfg. Co., Ltd.... ... D 1140
New Welbeck, Ltd. ... ... G 1527
Norma Technical Products, Ltd. ... E 1206
Radio Gramophone Development Co., Ltd. ... ... A 750 & 766
Shelley Potteries Ltd. ... ... C1026 & 1049
Short & Mason, Ltd. ... ... A 653
Smith's English Clocks, Ltd. ... ... D 1151
Speights, Ltd. ... ... F 1428
Stadium, Ltd. ... ... H 1629
Steiner, I. & M., Ltd. ... ... G 1502A
Sullivan, H. W., Ltd. ... ... A 646
Thermega, Ltd. ... ... A 659
Tintometer, Ltd. ... ... A 654
Union Radio Co., Ltd. ... ... A 741
United Steel Companies, Ltd. ... ... D 1132
Waite & Son, Ltd. ... ... F 1345
Walker Fender Co., Ltd. ... ... Earls Court 157
Webb, Thos., & Sons ... ... A 816
Woolf, Lewis, Ltd. ... ... A 714

Exhibits at Birmingham

Accles & Pollock, Ltd. (D. 510 & 611)
Solid drawn steel tubing, stainless steel tubing, cold rolled sections, capillary tubing, Bourdon coils, high-pressure tubes, Diesel oil feed tubes and composite tubes will figure prominently.

Aeraspray Mfg. Co., Ltd. (D. 729)
Duralumin body forgings ensure lightness of the company's spray guns without impairing their strength. Every thread carries a fixed renewable bronze

Aeraspray "Ultra Fanex" spray gun

part, giving indefinitely prolonged life. The "Victory" and "Ultra Fanex" models (illus.) have fan adjustment, together with pre-selective fan control, enabling the operator to change from round to fan spray without stopping work.

Among electrically operated compressor plant will be a model mounted on a fusion-welded horizontal air receiver and having dual control (automatic stop-start and constant running governing).

Alton & Co., Ltd. (D. 735)
A typical corrugated expansion loop for high-pressure steam mains, a pipe suitable for a modern high-pressure steam plant, and various standard products such as steam traps, etc., will indicate the scope of this company's activities. Sections of patent "Corwel" joints, a "Sanbride" joint and a creased bend show their construction, while a model will illustrate the relative flexibility of plain and corrugated pipes. Photographs of evaporators will be seen.

Altendorf and Wright (Cb. 708)
Cable accessories form this display.

Edgar Allen & Co., Ltd. (D. 719)
"Stag Allenite" tungsten carbide-tipped tools are available for cutting cast iron and non-ferrous materials, and "Stag Major Superweld" butt-welded tools carry an end of specially heat-treated super-high-speed steel firmly welded by electrical methods to a high-grade steel shank. A wide range of dies will be on view, together with small stainless steel, heat-resisting steel, manganese and ordinary steel castings.

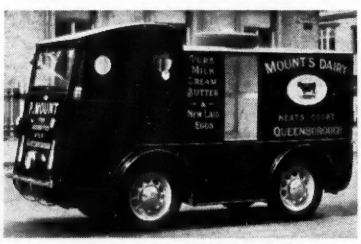
Allied Electrical Industries Finance Corporation, Ltd. (Cb. 200a)
In conjunction with Bowmaker, Ltd., and Banking Facilities Trust, Ltd., this company offers hire-purchase facilities for the sale or purchase of radio and electrical equipment, machinery, etc.

Arrow Electric Switches, Ltd. (Cb. 311)
In a new cooker control unit of unique design special care has been taken to ensure compactness, ease of wiring and an exceptionally attractive appearance. Water heater control units are made to meet every requirement, and the "Arrow Wilcolator" thermostat for cookers is now available with side connections, single hole fixing, which makes it interchangeable with 3-heat switches.

Magnetic contactor motor starting switches (illus. p. 235) are offered in a wide range of sizes, together with remote-control push-button stations. Starters are available with various overload protection arrangements. Numerous new small switches controlling fractional - h.p. motors for domestic appliances will be seen as well as rotary switches.

Associated Electric Vehicle Mfrs., Ltd. (Cb. 502 & 603)
This company controls both A. E. Morrison and Sons., Ltd., and Electricars, Ltd. The former concern's electric vehicles (illus.) will be represented by a 10/12-cwt. milk float ("Model F.66 MCD"), a similar van with a baker's type body, a 20-cwt. van ("Model 1872") with an unusually large body, and a chassis of a 10/12-cwt. "Model F.60" vehicle. Special features are the automatic delay action foot control, minimising the effect of unskilled driving, and the heavy duplicated brushes of the motor, designed to withstand considerable overloading.

Electricars' vehicles will include a 2-ton fixed platform truck, a 2-ton electrically operated elevating platform truck and an electrically operated light tilting truck. "Young" lead acid traction-type batteries are provided.



Morrison dairy van (Associated Electrical Vehicle Mfrs.)

W. T. Avery, Ltd., and Avery-Hardoll, Ltd. (D. 412 & 515)
Not previously shown, the Avery-Brownsdon wear and lubricant tester is designed to demonstrate the relative resistance to wear of various metals and the relative efficiences of lubricants in preventing wear. Among other testing equipment will be two universal type machines (10 and 50 tons), an electrically operated spring scragger, an impact tester, a direct reading hardness tester and a fatigue-testing machine.

New industrial weighing machines automatically totalise any desired run of weighings and also give the total weight of all loads. Automatic weighers will be represented by a portable sack net weigher and a liquid weigher, and an Avery-Hardoll petrol pump will be seen.

Babcock & Wilcox, Ltd. (D. 300 & 401)
Apart from the company's well-known piping, valves and "Class 1" fusion welding, new items will include a "Style 31" stoker with "Style 24" driving gear, a new type of oil burner and three different air registers, together with pressure atomising and steam atomising burners and a duel burner for gas fuel.

Exhibits will also be on view relating to the company's subsidiaries, the Stirling Boiler Co., Ltd. (photographs of recent installations of "Tri-drum" boilers); Edwin Danks and Co. (Oldbury), Ltd. (end plates for high-pressure Lancashire boilers); the Clarkson Thimble Tube Boiler Co., Ltd. (a new "Gycentric" silencer-economiser, consisting of a vertical pressure cylinder with thimble tubes protruding radially outwards into divided casing, forming the exhaust gas passes); the Calorizing Corporation of Great Britain, Ltd. (heat-treatment containers in "Calorized" mild steel and "Calmet" heat-resisting alloy); Erith's Engineering Co., Ltd. (a flue-type stoker); and Spencer-Bonecourt, Ltd. (drawings and photographs of recent installations of its boilers as supplied for waste heat recovery.

Bakelite, Ltd. (Cb. 408)
Synthetic resin products will include insulating materials, varnishes, resins and cements. Meter cases, fire bodies and radio cabinets will exemplify mouldings.

Baldwins, Ltd. (Cb. 312)
Electrical steel sheets of all grades for dynamo and transformer work will be represented, together with electrical steel stampings, including completed assemblies, finished laminations ready for assembly in stators and rotors, and various transformer types.

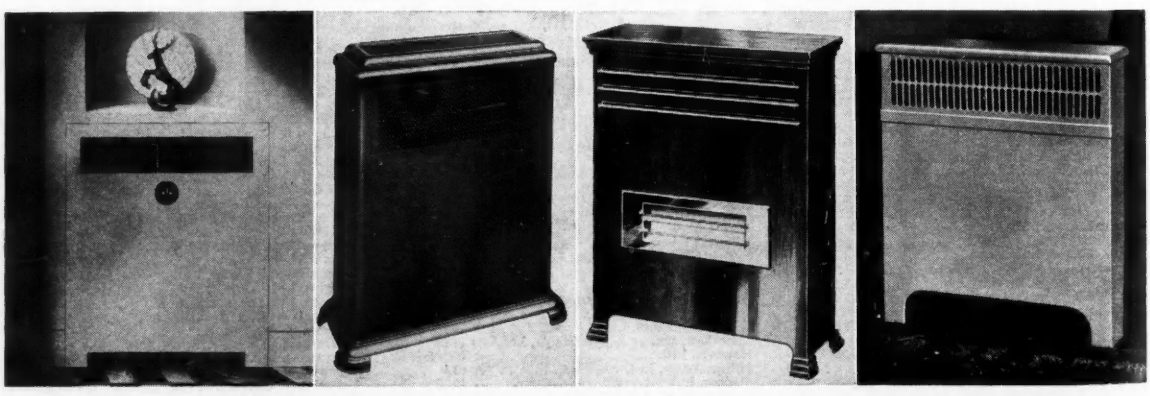
"Bank" Hardware Mfg. Co., Ltd. (A. 228 & 333)
Outstanding among a range of electric fires is the swivelling pattern "E.A.1" of unusual design, sold at a low price.

Banking Facilities Trust, Ltd. (Cb. 200a)
See "Allied Electrical Industries Finance Cpn., Ltd.

Barrett and Elers, Ltd. (Cb. 720)
"Belleroid" mouldings for electrical insulation will be a feature of this exhibit.

Barronia Metals, Ltd. (D. 325)
Metallurgical problems will be welcomed on this stand, where examples of the company's products will include the well-known corrosion-resisting alloy, Barronia metal; the "Berdo" range of high-duty nickel-lead alloys; and the recently developed lead and zinc soft-metal dies.

Beatty Bros., Ltd. (B. 632 & 719)
All this company's electric washers are claimed to have a washing action five times more effective than boiling, the operating costs being negligible. Three new washers will be on view—the "2A," with a two-tone porcelain enamel tub, the "SB," with a stainless steel tub, and the "SE" (illus. p. 228) finished in white, and there will also be a complete



Convection heaters are becoming much more popular. Here are four of the latest types: A concealed thermostatically controlled "Vectair" (British Trane), a Belling model, a Thermidaire heater with inset radiator (Brockhouse Heater Co.), and a Standard & Pochin design

range of ironers and other washing accessories. Arrangements can be made on the stand to try out apparatus in the home.

Beetle Products Co., Ltd. (Cb. 504 and 605)

"Beetle" and "Scarab" moulding powders will be shown in white, opaque and translucent forms; also transparent "Beetle" resins and lacquers, and examples of their applications.

Belling & Co., Ltd. (Cb. 308)

In addition to standard cookers there will be the new range of streamline cookers (illus.) and also the three "Baby" cookers. A display of fires, convectors (illus. p. 226) and air circulators will cover both domestic and industrial requirements.

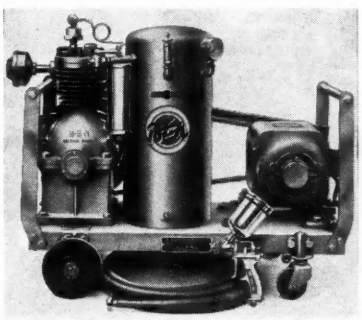
Belling and Lee, Ltd. (Cb. 702)

This stand will be devoted almost entirely to radio interference suppressors made to B.S. Specifications. Specially designed h.f. filters will be shown with and without chokes; h.f. chokes in hank form, and as complete units in metal cases, from 2 to 100 A.; lift and neon suppressors; flashing sign suppressors, etc.; and small units in bakelite cases for small appliances. For use at the listener's end there are set lead filters and the "Eliminoise" anti-interference aerial, television di-pole with reflector and spike aerials.

Of special interest to engineers will be the new all-wave radio field strength and noise measuring set manufactured to the design of the Post Office Engineering Department. In addition there will be electrical connectors, fuses, fuseholders, etc.

B.E.N. Patents, Ltd. (B. 629)

The most popular machine in the company's range of electrically operated paint spraying apparatus shown is the portable "Pneu-spray" (illus.), specially designed for heavy duty and continuous hard service. A 5in. to 6in. wide fan



B.E.N. "Pneu-spray" portable paint-spraying equipment

spray can be maintained and variations of spraying pressure from 10 to 70lb. per sq. in. can readily be obtained by means of an air-pressure unloader. For permanent installation, either for paint spraying or for other duties requiring steady volumes of air at constant pressure, the "Model H" compressor units can be supplied with automatic stop-start pressure switches and have a pressure range adjustable from 20 to 100lb.

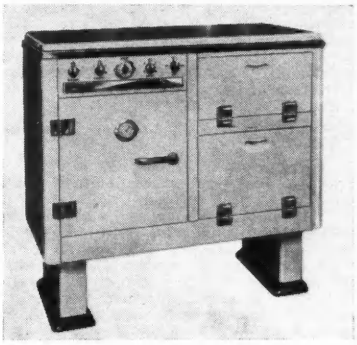
Berry's Electric, Ltd. (Cb. 209)

A new development in decorative electric heating, the "Chameleon," bases its effect on the scientific use of light, movement and colour, a radiant heater being suspended within an illuminated background on to which are reflected changing combinations of colour. During the summer the heater can be removed, and the illuminated background provides a very attractive setting for flowers, etc. Also included in the heating exhibit will be new designs of the "Haloberry" and "Mistoberry" type, and "Magicoal" fires embodying the new "Mirage" effect in which flames appear to leap from the coal itself.

The new 1½-gal. "Bellberry de Luxe" water heater (illus. p. 235) incorporates withdrawable type elements having a particularly large heating surface and minimised furring effects. Several new lighting fittings (illus. p. 240) will make their first appearance, together with a range of switchgear.

Best Products, Ltd. (Cb. 704)

The "Monica" (illus.) and "Mollie" automatic safety kettles shown are simi-



A streamlined Belling cooker

lar in design, except for the fact that the former incorporates an audible warning device in the lid. Current is automatically switched off if the water boils too low, the safety device operating equally well on a.c. or d.c. They are available in 2-, 3-, 4- and 6-pint sizes, with loadings of 700, 1,000, 1,500 and 1,800 W respectively, each model taking approximately eight minutes to boil from cold. Both copper and chromium-plated aluminium types are made.

Birkenhead Corporation (Cb. 613)

The industrial advantages, including electricity supply, of the borough are indicated by illuminated slogans and a map.

Birmingham Battery & Metal Co., Ltd. (D. 506 & 607)

Additional space has been taken this year to accommodate new exhibits, and to give an even more representative display. Constructed from the company's products, the stand incorporates large seamless copper and brass tubes, special finish copper housing pipes for water and heating services, cupro-nickel and aluminium-brass condenser tubes. An office in the centre is surmounted by plinths of brass tubes and is walled and panelled in copper, brass, phosphor-bronze and gilding metal. Showcases display representative examples of the smaller products.

Birmingham Electric Furnaces, Ltd. (Cb. 214 & 313)

The new "Birlec" continuous belt conveyor-type furnace (illus.) for brazing and bright annealing is designed to operate with an I.C.I. (Fertiliser & Synthetic Products), Ltd., patented recirculating type ammonia burner. This is the first time this type of burner has been applied to the continuous, conveyor-type furnace on a commercial scale. The furnace, which will be shown in operation, has a rating of 25 kW with a conveyor belt 12in. wide. It will operate at temperatures up to or slightly exceeding 1,100 deg. C., and can be used either for the bright copper brazing of steel and other articles or for bright annealing, bright normalising, etc., of both ferrous and non-ferrous materials and parts.

Larger installations will be illustrated by illuminated photographs, while sample products from "Birlec" furnaces, including bright annealed steel, stainless steel, brass, nickel-silver, etc.; examples of electric furnace brazing, clean hardened high-speed steel tools, carbon steel parts, etc., will also be on view. In addition, the "Birlec-Detroit" rocking, indirect, arc melting furnace; the "Birlec-Lectromelt" direct arc melting furnace, and the "Birlec-Kaercher" salt bath for the heat treatment of light alloys will be shown in model form.

Other types of furnace may be inspected at the "Birlec" works nearby.

Birmingham Electric Supply Department (Cb. 406)

An inquiry bureau will furnish full particulars of electrical facilities in Birmingham. Information will also be available of the progress made by the

"Monica" automatic kettle with warning device (Best Products)

Department, and of various applications of electricity in the area.

Black & Decker, Ltd. (Cb. 410 & 513)

Drills from 3/16in. to 1in. capacity in steel will include the "Junior" types and models for intermittent service or for heavy-duty work. "Van Dorn" portable electric screwdrivers, tappers and grinders (illus.) will be seen, together with light- and heavy-duty sanders, standard and automatic portable electric vitrifiers, bench grinders,

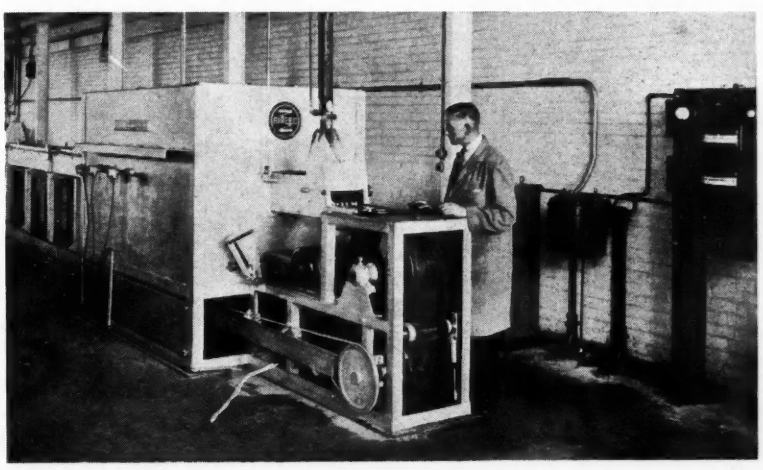
Van Dorn die grinder (Black & Decker)

the "Electric Valve Shop" for garages, and various accessories.

S. O. Bowker, Ltd. (Cb. 317)

The well-known "Tenby" electrical accessories will be represented by various types of junction boxes, including round and bakelite models, plain and decorative switchplates; saddles; earthing clips; bonding bars and rings; and conduit accessories.

"Tenbyluxe" switches, available in a



A "Birlec" continuous brazing and bright annealing furnace (Birmingham Electric Furnaces)

wide variety of surface and flush designs, have proved their reliability in buildings of all descriptions, while the "Tenby Pilot" models have been introduced to meet the increasing demand for shallow switches of reliable construction and moderate price.

Bowmaker, Ltd. (Cb. 200a)

See "Allied Electrical Industries Finance Corporation, Ltd."

Bratt Colbran, Ltd. (Ca. 604)

Complete mantels incorporating electric radiators are a speciality, and several new types will be seen. Among a very extensive range of inset fires the "No. 149" and "No. 153" models are of especial interest on account of their ease of fixing (no cutting away of the wall is required) and their low initial cost. Two of the most popular of this season's portable radiators are the "Flamingo" and plain, yet attractive, "No. 146."

The "Lectracoal" imitation coal fire "No. 167" (illus. p. 240), which can be supplied to fit into any existing fireplace, is fitted with reflector-type elements, a new departure for this type of radiator. Convectors are rapidly gaining favour, particularly those in the lower loaded class (750 and 1,000 W).

Geo. Bray & Co., Ltd. (Cb. 305)

In addition to a full range of the well-known "Chromalox" heaters, which, on

A kettle with "Tubalox" elements (Geo. Bray)

account of their robust construction, are particularly suitable for industrial applications, will be shown the new "Tubalox" immersion heaters and kettle elements (illus.), with and without safety cutout. Specimens of refractories include plain and screwed tubes, rods, firebars, discs and small intricate pieces.

Britannia Batteries, Ltd. (Cb. 503)

Stationary batteries (illus. p. 229) are made with double glass and lead-lined boxes, while vehicle and marine batteries have long-life tubular positive plates and negative plates with a "rippled" surface, providing better acid circulation. "Pertrix Extra" car starting and lighting batteries carry a two-year unconditional guarantee, types being available both for passenger and commercial vehicles. The "Pertrix Bulldog" h.t. batteries and "Pertrix" accumulators are popular for all radio work, and a special feature will be made of the recently introduced celluloid box cell designed for the latest portable sets. Batteries for sound film work, cycle lamps, bell circuits, police lamps and square type dry inert cells will also be represented.

Britannia Electric Lamp Works, Ltd. (A. 513)

Besides a complete range of household, pigmy, sign and ball shape, traction, night light and automobile lamps, a feature will be made of the new "Excelsior" types, which are claimed to give a 100 per cent. more concentrated light and have a lower current consumption for a 50 per cent. longer life than standard lamps.

Britannia Tube Co., Ltd. (D. 510 and 611)

This exhibit will comprise mild steel and stainless steel tubes in close joint, open joint and welded qualities, bent and straight; mild steel tubes cased with brass; aluminium and stainless steel; angles, channels and sections in mild steel and stainless steel; seamless aluminium tubes; and atomic hydrogen-welded tubes in stainless and heat-resisting steels for use as heating and cooling coils, pyrometer sheaths, &c.

British Electric Domestic Appliances, Ltd. (Cb. 713)

A range of "Bedal" electric washers shown for the first time will comprise the "Astoria," "Gyrator," "Imperial" and the "Cabinet" (illus. p. 240), the last mentioned representing an absolutely new departure. The well-known "Mary Ann" and "Bedalux" vacuum cleaners will be represented, and a further entirely new "Bedal" product is promised.

British Electrical Development Association (Cb. 306 & 407)

Visitors are cordially invited to make use of the attractive kiosk and information bureau in the centre of the Electrical Section, at which service can be obtained, particularly in regard to electricity supply facilities all over the country.

British Emulsifiers, Ltd. (A. 524)

The "BEL Empire" homogeniser (cream maker) is driven by a ¼-h.p. electric motor with an automatic overload switch and has an output of 12 gals. per hour.

British Oxygen Co., Ltd. (D. 312 & 411)

Visitors will be able to see demonstrations of oxy-acetylene welding and cutting in all classes of work, and will be shown how invaluable portable outfits can be for repair and maintenance. With its extensive range of "Alda" welding rods and fluxes, the company is in a position to tackle almost any problem in non-ferrous as well as ferrous welding. Problems of brazing and soldering encountered in electrical engineering will be welcomed, especially in view of the success of the new "Cuprotectic" rods.

British Sangamo Co., Ltd. (Cb. 402)

Multi-coin prepayment meters (illus. p. 235) and variable rate fixed-charge collectors are available in several forms, and among a.c. single-phase watt-hour meters is a new 100-A self-contained model housed in bakelite. Polyphase watt-hour meters, test blocks, splitter blocks, maximum demand attachments, ampère-hour meters, synchronous motors and clock movements will also be seen.

The new "J5" portable test meter has five self-contained ranges of 1, 5, 10, 25 and 50 A, while a new multi-range current transformer is suitable for use with sub-standard instruments. Among stop watches for meter testing the "A.20" beats and records to 0.05 sec., thus conforming exactly with the specification of the Meters Act. The new Sangamo "AD" demand meter, which operates on the thermal principle, is built in six capacities from 5 to 80 A.

The range of "S8" synchronous time switch introduced last year has been extended, and has been developed as a single-pole change-over type. For short period service work, the switch is available with a one-hour dial, and a new short interval switch permits settings between 3 and 45 secs.

Among Weston indicating, light measuring, radio servicing and aircraft instruments are a new multi-range current transformer and the "E.772" analyser for radio and television servicing.

British Thermostat Co., Ltd. (Cb. 700)

A special feature will be made of domestic refrigerator controls (illus. p. 231) embodying an adjustable temperature regulator and hand-operated switch. Similar units are available for ice-cream cabinets. For controlling commercial installations having motors of over 1½ h.p. contactor gear is used.

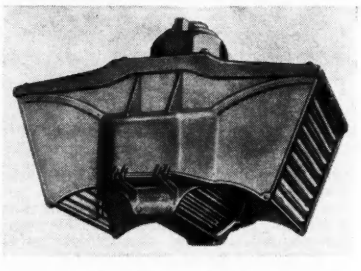
Pressure controls are available for both large and small refrigerator installations, while magnetic valves are used to control refrigerant flow in multi-temperature installations. A new automatic expansion valve (pressure-operated or thermostatic) is shown for the first time.

Bi-metal and vapour pressure-operated thermostats for controlling room temperature will include "Model RT," available in a wide range of colours. Model "AC" incorporates a hand switching device for locking the circuit on or off when desired. Other models are made in bakelite and moisture-proof metal cases for heavy duty.

For air conditioning there are humidstats, multi-step thermostats, damper operating units and motorised valves. Other types of thermostatic switches will be displayed for operating on duct temperature, for immersion in heated liquid, and for medium temperature industrial applications. Boiler pressure controls and safety devices will include pressure-operated switches, excess temperature cut-outs, and contact thermostats. "Teddington" hydraulically operated motorised valves and damper units will also be on view.

British Thomson-Houston, Ltd. (Cb. 404 & 507)

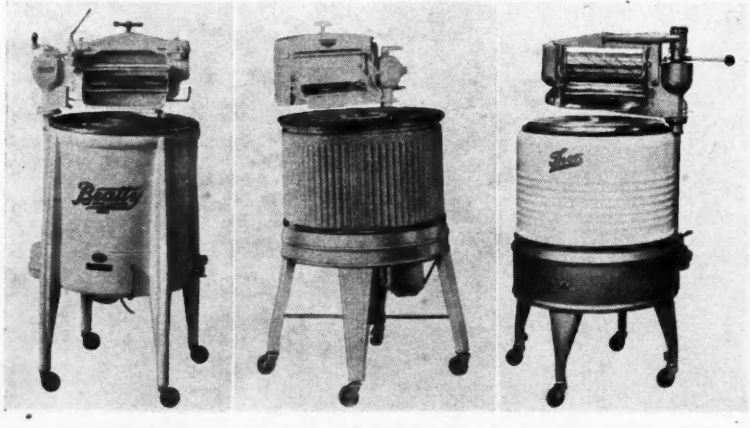
This attractive stand is in the shape of a large four-pointed star. The central



B.T.H. "Mercra H" lantern

section, besides serving as an office, forms display windows for "Mercra" and "Mazda" lamps. From this main construction four radial fins with end columns and plinths provide lighting troughs to house street lanterns, "Mazdalux" floodlight projectors and industrial fittings. Photographs of installations are shown illuminated.

Features of the street-lighting equipment are its high efficiency with low maintenance. The improved "Mercra H" lantern (illus.), designed for side mounting and incorporating a patented magnetic deflector, is the only horizontal unit using standard high efficiency mercury lamps with standard chokes. The "Dilen," employing a 250- or 400-W "Mercra" lamp, has extensive applications in roads being converted to trolley-bus working, while the "County Junior" is specially intended for side-street lighting. "B.T.H. Mazdalux" dispersive and angle-type fittings have been installed in many industrial premises with excellent results, and the company's floodlighting projectors have proved their worth especially during the Coronation celebrations.



Three new washing machines: The Beatty "S.E.," the "Goblin Beautility" (British Vacuum Cleaner & Engineering Co.), and the "Thor 150" (Hurley)

Experience gained from increasing sales has led to improvement in mechanical construction of "Mercra" electric-discharge lamps, and, in addition, "Mercra" fluorescent lamps and "Mercra" lamps with ultra-violet filter bulbs have been developed. Besides "Mazda" lamps for all decorative and general lighting purposes there will be "Mazda" projector lamps for airports, cinemas, film studios and for sound reproduction and recording.

British Trane Co., Ltd. (B. 323)

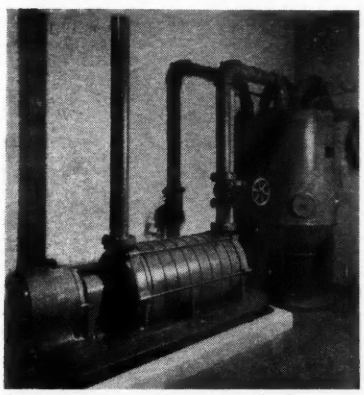
Working models will show the method of operation of electric "Univectairs" for heating (with electric heating elements incorporated) and cooling (in conjunction with an electrically operated compressor). These low-priced units are especially designed for factories, stores, public buildings, &c.

For warming hotels, restaurants, hospitals, schools, cinemas, offices, private residences, &c., the electric "Vectair" convector heaters can be supplied in a variety of attractive designs, including concealed types (illus. p. 226) and a model with a glow effect. A temperature control can be secured either by built-in or independent wall fixed thermostats. Several "Vectairs" are shown in model form.

British Vacuum Cleaner & Engineering Co., Ltd. (Cb. 205)

The largest of four working models of the industrial vacuum cleaner plant is a four-operator plant intended for central installation but capable of conversion into a portable set. It has a 6-b.h.p. motor and is popular for factory cleaning and surface cleaning in boiler-houses, &c.

Both the two-operator (4-b.h.p.) and the one-operator portable cleaners (1½ b.h.p.) are carried on small platform trucks with bogie fore-carriage and draw-bar. They are largely used in factories and for the cleaning of upholstery in



A commercial vacuum cleaning plant (British Vacuum Cleaner & Engg. Co.)

buses and passenger coaches. The smallest industrial model shown (¾ b.h.p.) has many applications in factories, cinemas, garages, public halls and churches, &c. About a third of the stand area is occupied by the company's latest domestic "Goblin" cleaners.

Boiler flue dust removal plants as installed in Fulham, Barton, Kirkstall, Nechells, &c., power stations, and also the larger cleaner installations up to 40 b.h.p. are shown by photographs.

Brockhouse Heater Co., Ltd. (Ca. 606 & 709)

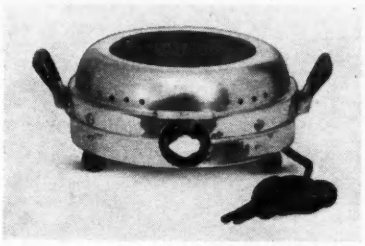
"Thermidair" electric convection heaters provide constantly moving heated air, and there is no danger of damaging decorations or furniture. They are easy to install and the running costs are low. For rapid initial heating a model with an inset electric radiator (illus. p. 226) is available.

J. Broughton (Cb. 600)

By their twin ball and socket construction the "Twinsok" lighting units for presses, machine tools, &c., allow unrestricted adjustment in any direction.

Bulpitt & Sons, Ltd. (Cb. 514)

A larger stand than in previous years will permit a much more representative display of "Swan Brand" electric products, which include a full range of improved kettles and several new lines. Among the latter are a heating pad and



"Swan Brand" portable boiling plate (Bulpitt)

a portable boiling plate (illus.). A new and enlarged catalogue will be available.

Burco, Ltd. (Cb. 315)

Among the complete range of "Burco" electric wash boilers will be the popular hire type models and the combined wash boilers and bath or kitchen water heaters. The company's electrically heated washing machine illustrated incorporates a 10-gal. wash boiler loaded at 3½ kW, and has a hand agitator with a simple backward and forward movement. The hand wringer supplied folds up at the back allowing a porcelain table top to be fitted.

Bylock Electric, Ltd. (Cb. 724)

Various types of cylindrical vacuum cleaners, floor polishers, floor dryers, with moulded cases, hand dryers, electrically heated cushions and blankets are all new products since the last Fair. One of the cleaners, which will be confined to the trade, will have an extremely low net price.

Cable Makers' Association (Cb. 300 and 401)

The research and test side of cable manufacture will be stressed. Raw materials will be available for inspection, together with the finished products, and a film will trace various stages of manufacture. Early examples of cable making will be of interest.

Canadian Government Exhibition Commission (B. 632 & 719)

Various home laundry equipment makers, including Beatty Bros., Ltd., the Hurley Machine Co. (England), Ltd., and MacGregor and McCallum, Ltd., will have displays on this stand. Individual descriptions of the exhibits are given elsewhere in these notes.

W. Canning & Co., Ltd. (Cb. 120 & 215)

A new automatic machine (illus. p. 230), designed for polishing small circular articles such as stainless steel lamp rims, hub caps, etc., comprises a horizontal rotating indexing table fitted with five chuck spindles. The three 2,900-r.p.m. polishing motors (totally enclosed) are movable through an angle of 45 deg., and are provided with push-button control. Horizontal, vertical and cross adjustments are possible and devices are included for feeding polishing composition to the mops, and for adjusting the pressure of the latter.

Other polishing machines exhibited will be two semi-automatic centreless machines for rods, tubes, discs and circular shaped articles; and an automatic apparatus for polishing plain cylindrical and irregular shapes. A polishing motor will have an improved dust extractor.

Barrel plating will be represented by a motor-driven "Quickplate" barrel. Other plating barrels are the "Novat," with which no vat is necessary, the "Major" and "Minor" barrels for "sample" plating and bench mounting. An electrically heated centrifugal drying machine for drying small articles after electro-plating or barrel burnishing, plating dynamos and motor generators, and a metal plate rectifier with control panel will complete the display.

Carron Company (Cb 723)

In the "Carronade" cooker (illus. p. 234) the heat circulation is controlled by a removable bottom tray. Plug-in elements are fitted, while the oven interior is easily removable. The other cookers on display are the already well-known "Carronian," "Carronette" and "F" types.

Fires in various styles and finishes will include the "Carronaid" fire (illus.

A Burco washing machine

p. 240), the "Carrometer" prepayment type, and log grates with imitation coal fire effect. The company's popular "Ben Ledi" grate has now been adapted for electric heating. Various types of outset and inset fires, tubular heaters and irons will complete the exhibit.

Carter & Co. (Nelson), Ltd. (Cb. 714)

Electric syrens for air-raid, fire and general alarm purposes are made from 1/10 to 20 h.p. (illus. below) to operate from any available electricity supply. Cowls fitted over the top, besides making a weatherproof cover, direct the sound where it is most effective. Under ideal conditions a 3-h.p. model has a range of 1½-2½ miles. For use with these syrens, switches, relays and contactors are available in a variety of forms.

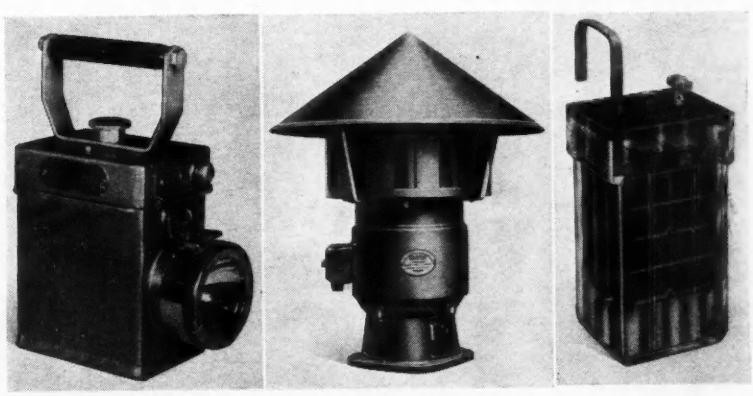
Portable petrol-electric generating sets weighing only 68 lb., have a steady output of 300 W at 12, 110 or 230 V.

C.A.V.-Bosch, Ltd. (Cb. 501)

See "Joseph Lucas, Ltd."

Cellactite & British Uralite, Ltd. (B. 522 & 625)

Building, gas flue and ducting products are made to withstand the severest conditions. The uniformity in material



A Concordia "Handy" officials' lamp, a 20-h.p. Carter syren, and a Britannia sealed-type stationary cell

and guaranteed permanence of "Cellactite" asbestos protected metal roof sheets and ventilators is of real assistance to those planning complete roofs, while "Urastone," being incorrosible, is being used increasingly for fume ducting, air-conditioning vents, etc. The new fireproof "Kimoloboard" can be worked like wood yet will not warp, shrink or crack, and it has a high heat insulation value. "Asbestone" asbestos cement in the form of flat and corrugated sheets and various sundries will also be displayed.

Chloride Elecl. Storage Co., Ltd. (Cb. 307)

A typical "Keepalite" emergency lighting system (illustrated), together with a floating battery cinema safety lighting system, will be demonstrated, and specially designed switch tripping batteries will be arranged in a compact cupboard with trickle-charging and testing apparatus.

Besides open-type, semi-enclosed and fully-enclosed Chloride batteries for lighting and power purposes there will be "Exide-Ironclad" batteries for vehicle propulsion, marine work. bus lighting, train lighting and other special needs of the heavy engineering trades.

Clarkson Thimble Tube Boiler Co., Ltd. (D. 300 & 401)

See "Babcock and Wilcox, Ltd."

Coleman & Appleby, Ltd. (Cb. 216)

New designs of plating barrels will be of interest on account of their strength, speed of plating and simplicity. "C and A" electric heaters, fixed or portable, meet all the needs of the plating shop, while portable pumping and filtering equipment will handle all plating solutions except chromic acid. Demonstration of a plating rectifier will show the advantages of the simplified controls for providing minute variation over the whole voltage range required. The company's polishing motors have extra stout spindles and cover a range from ¼ to 5 h.p.

An improved "Perfecta" white finish for nickel, silver, copper, aluminium, &c., and the cheaper "Apex" finish are now available, as well as a new range of "Tripoli" composition. The "New Cromex" white finish is harmless to the user. Chemical mops, and a new plating rack are also supplied.

Concordia Electric Safety Lamp Co., Ltd. (Cb. 505)

New designs of miners' safety lamps include a shaft inspection lamp fitted with a safety device which operates if the wellglass is broken; the "Handy" officials' lamp (illus. p. 229), designed to give maximum light at minimum weight; the "Midget" lamp, weighing only 2½ lb., but lasting a full shift; an anti-explosive torch for use in atmospheres containing petroleum vapour, acetone vapour or coal gas; police lamps; and "Paddy Mail" lamps. Miners' hand and cap lamps, portable photometers, charging apparatus, &c., are other well-known products.

Constructors, Ltd. (Cb. 506 & 607)

The greater portion of this stand will be devoted to "Adjusteel" shelving. Rod and bar storage racks, both vertical and horizontal, will be exhibited, together with other items, such as steel cycle parks and clothes lockers.

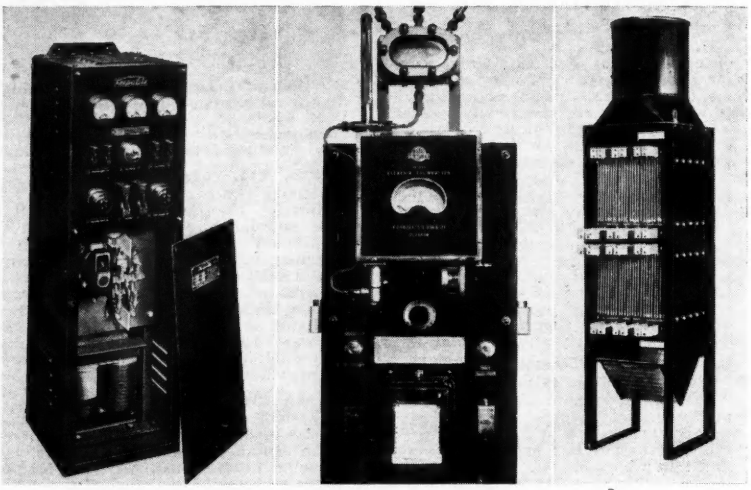
Corfield-Sigg, Ltd. (Cb. 414 & 517)

Examples of the company's "Crown Merton" aluminium ware for electric cooking will be found on the General Electric Co.'s stand.

Cotto Products (A. 326)

An entirely new all-British electric washer incorporates a patent cam and vacuum paddle having a rise and fall and semi-rotary motion which is imparted downwards through the lid. The tank is thus entirely clear when the lid is opened. Ordinary household washing is guaranteed to be spotlessly clean in two minutes. An electrically heated model raises the temperature of the water from cold to 140 deg. F. in one hour.

The electric wringer fitted has an ingenious quick release action. The machine is finished in self-colour vitreous enamel, all fittings being chromium plated. When not in use the apparatus is fitted with a neat white vitreous enamel table top.



A Chloride "Keepalite" cubicle equipment, a "Crockatt Simplex" electric salinometer and a Westinghouse plating rectifier under construction

Coventry Refrigerator Co., Ltd. (Cb. 718)

"Percold" equipment will include both domestic and commercial refrigerators, ice-cream plant, milk bars and air-conditioning apparatus.

W. Crockatt & Sons, Ltd. (D. 718a)

In addition to "Crockatt Simplex" electric floor polishing machines, valve reseaters, boiler tube brushes and scrapers, etc., an especially interesting exhibit is the "Crockatt Simplex" patent electric salinometer (illus. above), which is being largely adopted not only for marine work but also in land power stations. Its installation reduces boiler repairs by giving immediate warning of excessive impurity in the feed water, which would otherwise involve the descaling or renewal of the tubes.

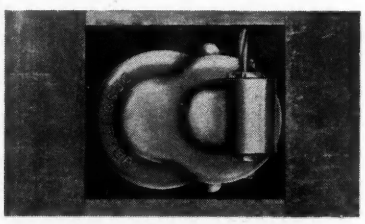
T. H. & J. Daniels, Ltd. (Cb. 125)

Equipment for the production of plastic mouldings widely used in the electrical trade will include a 50-ton downstroke semi-automatic press, complete with self-contained pump and fitted with electrically heated platens with thermostatic control. This will be shown producing small moulded articles.

A 500-ton hobbing press (illus. below) demonstrated is used for producing multiple moulds. A "master hob" of special hard steel is made, and this is pressed cold into soft steel blanks, which are afterwards machined, case hardened and become the actual moulds. The pressures required are very high, being often in the neighbourhood of 100 tons per sq. in. The company's "Size 2" machine for preforming moulding powders into tablets will also be seen working.

Desoutter Bros., Ltd. (Cb. 118 & 213)

Alternative speeds are available in all sizes of electric drills for use on high tensile steels, mild steels, aluminium, wood, etc. The lightness and compactness of the tools, besides reducing fatigue to the operator, enable holes to be drilled in what have previously been inaccessible places. All the armatures are former wound with individually taped coils, and are vacuum impregnated. Ball bearings are employed throughout. New special purpose drills of novel design will make their first appearance, and examples of grinders will also be included.



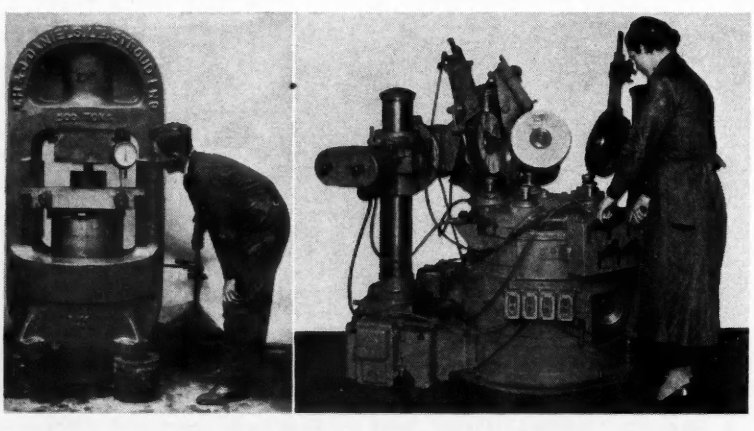
Desoutter "A.2" corner drill

"Diamond H" Switches, Ltd. (Cb. 512)

Some of the company's flush type cooker switches shown will incorporate "Diamond H" mains switches and semaphore signalling devices, while a display of new one-hole fixing hydraulic type oven thermostats will demonstrate the various colour combinations obtainable for switch and thermostat handles. New water heater and radiator control units (illus. p. 231) comprise the new "Diamond H" flush switch, pilot lamp, bullseye and fuse boxes designed on very modern lines. Several new types of switches will be available, including a range of a.c. switches.

Dominion Machinery Co., Ltd. (B. 325)

Individual electric motor drive is being employed to an ever-increasing extent on this company's woodworking machines, which include saw benches, band saws, spindle moulders, cross cutters, dovetailers, surfacers, chain and chisel mortisers, tenoners and wood turning lathes.



A 500-ton mould hobbing press (Daniels) and an automatic polisher (Canning)

Donovan Electrical Co., Ltd. (Cb. 309)

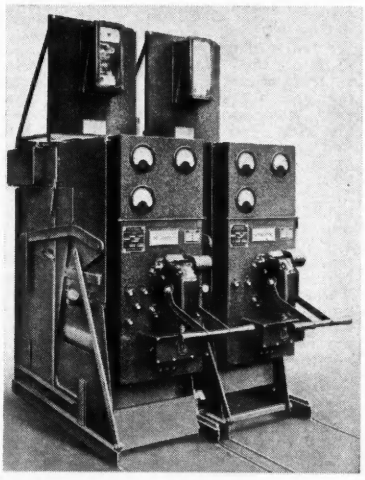
Among new products will be the "Runtact" power duct (illus.), an overhead bus-bar runway and collector trolley for supplying portable tools without the danger or nuisance of long lengths of flexibles. For this and other types of trolley wires, a new earthing switch will be demonstrated having a trapped key in the lid which can only be removed when the switch is earthed.

The efficiency of the contact of the "Scrutact" fuse will be demonstrated by allowing visitors to hang their weight on one, although the only force resisting the pull is the outward pressure on the parallel jaw faces, and one turn of the screw handles immediately releases the fuse bridge. These fuses are available in new thoroughly shielded forms for use in fuseboards.

A direct-on-line a.c. starter with isolator can be supplied with a transformer for low voltage lighting in the same case. Other new developments are a particularly compact but robust counter-e.m.f. starter and a number of limit switches. "Safuse" rewirable fuse-boards, switch and fuse gear, change-over switches, motor control gear, and contactors will also be represented.

Drew, Clark & Co. (A. 232)

"Diamond" ladders and steps are made in adjustable travelling telescope and disappearing types. The "Rap-Rig" scaffold combines lightness with



English Electric "O.L.C." switch pillars

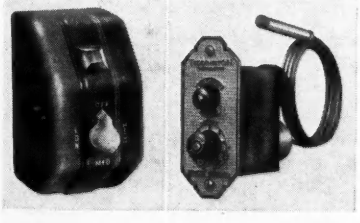
strength and needs no tools for erection. It is claimed to halve pole scaffold costs.

W. T. Driver (Cb. 111)

A heating attachment for electric fans and the "Empire" trouser presser will be seen on this stand.

Earle, Bourne & Co., Ltd. (D. 500)

This stand will display specimens of brass, copper, aluminium alloy ("Sebalin") in strip, sheet, tubes, angles, channels, sections, ornamental tubes and mouldings, radiator sheets, plates and tubes; brass and copper film; special brass for the clock industry;



"Diamond H" radiator or water heater control unit, and (right) a British Thermostat Co.'s "S.D." domestic refrigerator thermostat

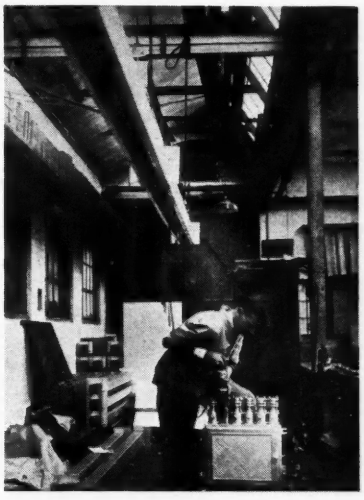
electric fire sheets; and copper service pipes and bends.

Electricars, Ltd. (Cb. 502 & 603)

See "Associated Electric Vehicle Manufacturers, Ltd."

Electrona Electrical Products, Ltd. (B. 211)

The "Duplextra" portable sander and



The Donovan "Runtact" power duct for supplying portable tools with electricity

the "Duplex 75" floor polishers will be among electrical apparatus for building and general woodworking purposes.

E. Elliott, Ltd. (Cb. 413)

A range of trade mouldings in bakelite, beetle, scarab, etc., and also injection mouldings in cellulose acetate will form this exhibit.

Enfield Rolling Mills, Ltd. (D. 224 & 321)

Here will be exhibited non-ferrous metals rolled, drawn and extruded in the form of sheets, coils, circles and sections produced from copper, brass and zinc. Enfield Zinc Products, Ltd., an associated company, will show zinc cans for dry batteries.

English Electric Co., Ltd. (Cb. 510 & 611)

A large transparency reproducing a temperature curve will give striking evidence of accuracy obtained with "Ritemp" automatic oven control, which is available on the three standard cookers shown. These models will also be exhibited with three-heat switch control, together with the "HC.210" cooker, suitable for small households or flats, and the popular breakfast cooker. Fires to suit all tastes will comprise coal-effect, portable and wall mounting types. Examples of 1½- 3- and 5-gal. water heaters (illus. p. 235) will be on circuit, and the popular "My-Domestic" washing machine will be demonstrated.

Among fuse gear for industrial and sub-station distribution, incorporating the company's high rupturing capacity, non-deteriorating cartridge fuse will be a "Combination" fuse-switchboard for factory distribution, an example of the E.E. overhead distribution system for factories employing individually driven machine tools; medium and heavy duty distribution boards with simple and rapid cabling facilities and front-indicating handles which permit the immediate localisation of blown fuses; the "U.35" distribution units for feeder pillar and sub-station use, with interchangeable sockets which eliminate the necessity for crossing the cable cores when phasing out; "Skeltag" link and fuse units; pole-mounted, ground-operated fuse units for short-circuit protection of rural distribution networks. "Zed" fuses and fittings; and a floor-mounting "Combination" fuse switch and meter housing.

Fractional-h.p. motors will include split-phase, three-phase and capacitor types, with sleeve or ball-bearings and with various forms of mounting; motors with an automatic belt-tensioning device, from 1/6th to 1 h.p.; and geared units of the worm and spur reduction type. Shown in operation will be a 3-phase 50-cycle, 2,800-r.p.m. motor driving a Varley suds pump, and a 1/6th-h.p. capacitor motor incorporating a built-in thermostatic control unit, as used largely for domestic refrigerators.

The compact "O.L.C." metal-clad switch pillar (illus. above) is available with a breaking capacity up to 150,000 kVA for systems up to 11 kV, and has current ratings from 200 to 800 A.

House service meters will be displayed in both quarterly and prepayment types, the former in metal and bakelite cases. The prepayment meter switch will be seen operating under load conditions.

Ether, Ltd. (Cb. 716)

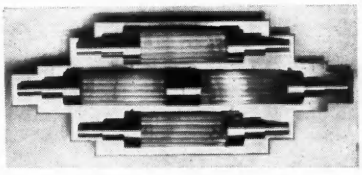
A working model will show the method of operation of the "Indicorder" controlling recorder, which controls the temperature of electric, gas and oil-fired furnaces in conjunction with contactors or motor and solenoid operated valves, the motor driven units also operating dampers and air supplies. The controlling recorders provide an output and progress record of the furnace operation.

The company's molten metal pyrometers can be used for indicating the temperatures of all non-ferrous metals, also low-temperature cast-iron, etc. A quick-reading surface contact pyrometer to be shown in operation is used for taking the temperature of bakelite moulds, die-casting moulds, duralumin billets, etc. Stevenson's patent moving coil galvanometer, of which there will be a working model, is embodied in all edgewise and round type indicators. Incidentally, the company's 12 in. scale edgewise indicator is claimed to be the longest scale indicator on the market.

The "Chromel Alumel" type thermocouple is arranged so that burnt-out wires or sheaths can be rapidly replaced. Ether thermo-electric and resistance pyrometers are used extensively for measuring steam temperatures, flue temperatures and also in heat treatment annealing, case hardening, normalising, metal melting and other processes.

Evenlite Tube Lamp Developments, Ltd. (Cb. 114)

A comprehensive range of tubular lamps in many colours will include lamps in coloured and ribbed glass, plain and with sand-blasted designs, 20, 30, 40 and 50 mm. in diameter. Both the



Evenlite fittings are made to customers' requirements

new Evenlite strip lamps and the new conical candles, which are available in a variety of permanent and non-fading colours, have unbreakable metal interiors. Fittings incorporating the company's lamps (illus.) and also signs and other advertising matter constructed in tubular lamps will be displayed.

W. T. French & Sons, Ltd. (A. 433)

An indicator showing the correct heat for various fabrics is an outstanding feature of the "Mysto No. 999" electric iron, which also incorporates a streamlined sole, an automatic switch and a double thumb rest for right or left hand. The "Mysto" foolproof kettle, which is fitted with a patent cut-out, is available in 2- and 3-pint sizes in polished aluminium or copper, all models being loaded at 1 kW.

The "Volcano" reflector fire (W. T. French)

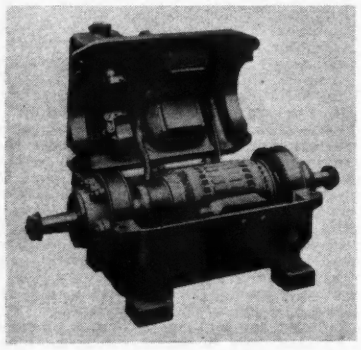
Ivory, light blue or pastel green are the attractive finishes of the neat "Volcano" reflector fire (illus.), which is obtainable loaded at 600, 1,000, or 2,000 W.

Gascoignes, Reading, Ltd. (D. 707)

This company is to display electrically operated milking machinery.

General Electric Co., Ltd. (Cb. 414 & 517)

Special attention is drawn to a new range of d.c. steelworks motors up to 200 h.p. (illus.), specially designed to reduce the inertia of the moving parts to a minimum to meet the requirements of

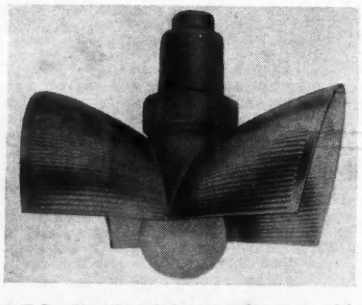


G.E.C. steelworks motor with top half of shell open

quick starting, stopping and reversing. They are of particularly heavy construction to withstand the severest conditions and the insulation has been chosen for its resistance to electrical, mechanical and heat stresses. A.c. induction motors for industrial use will include protected, totally-enclosed, and totally-enclosed cowl-cooled squirrel-cage types and also a totally-enclosed slipring motor, which is provided with internal sliprings and thus allows a shaft extension to be arranged at both ends.

A complete bright annealing plant (in operation) will comprise a 55-kW electric furnace, together with the necessary automatic temperature control gear, Cambridge charge temperature indicator, main switchgear, and equipment for providing a suitable artificial atmosphere. The three pots used will be handled by a Witton-Kramer overhead hoist with electric lift and hand traverse.

Street lighting equipment will be represented by "Di-fractor," "cut-off," "directional" (new), "Hackney" and decorative types (all for use with "Osram" or "Osira" lamps); also the "Watford" ("Osira" only). A model road system will be illuminated in accordance with the recent recommendations of the Ministry of Transport Departmental Committee. The new 400-W



G.E.C. directional lantern for use with "Osira" lamps on side roads

"Osira" luminescent lamp gives a whiter light than the standard "Osira" e.d. lamp.

The new "D.C. 438" small family model "Magnet" cooker (illus. p. 234), which replaces the "D.C. 334, 435, and 434" models, embodies such improvements as a relatively large capacity (over 2,000 cu. in.), and an all-rounded oven interior and warming cupboard lining. Elements and oven interior are interchangeable with those of previous models. Other cookers incorporate four-heat boiling heat control and oven thermostats. The "Heatstor" cooker is becoming increasingly popular overseas. Both "enclosed embedded" and "radiant" hotplates are prominently exhibited and a new attachment enables an additional plate to be mounted on the side of an existing cooker without structural alteration.

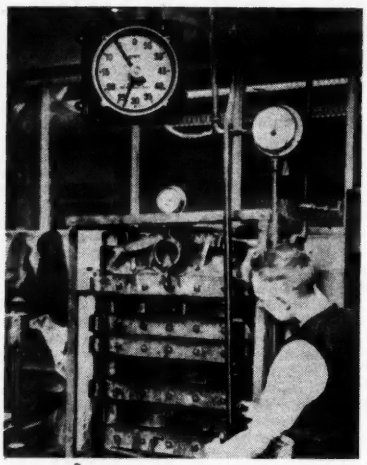
"Celdair" refrigerators are available in sizes from 3 to 20 cu. ft. The wide range of small household appliances will be represented by such recent introductions as the bakelite fire, bakelite fan heater, streamlined iron, and a new range of kettles (see Feb. 4th issue, p. 165).

Gent & Co., Ltd. (Cb. 515)

A tower clock with four 4½-ft. externally illuminated dials and hands, located at the Exhibition entrance, is driven by a standard Gent synchronous turret clock movement, while over sixty impulse clocks distributed over the Fair buildings will be controlled by a master clock on the company's stand.

On the stand itself will be a 3½-ft. neon illuminated clock and a complete system of impulse clocks with ornamental dials suitable for hospital, hotel or industrial purposes. "Pul-syn-etic" electric impulse clocks for marine purposes; independent synchronous clocks for industrial and household purposes; a special master clock, the "Dac-chronometer," with automatic maintaining power to provide against mains failure; striking and chiming mechanism; and process timing equipment (illus.) will also be represented.

Other examples of the company's activities will be provided by luminous call systems; "Tangent" staff locators; bell indicators, including two attractive new metal-clad models for surface or sunk fixing; bells and sound signals, in-



Gent process timing clock controlling a rubber press

cluding electro-motor syrens; fire alarm equipment, among which is a new automatic equipment employing thermostats and/or manually-operated contacts, necessitating in most cases only one ring wire; relays; telephones; mine signalling apparatus; watchman's electric tell-tale clocks, which record the movements of the night watchman without his actually visiting the recorder itself; oil and liquid level indicators and alarms for waterworks, gasworks, or oil refineries, etc., and also for marine purposes. A new liquid level indicator for remote working uses the Post Office telephone circuit.

F. Gilman (B.S.T.), Ltd. (Cb. 516)

This company will display examples of its flexible drive tools.

Girdlestone & Co. (D. 323)

The "F.M." series centrifugal motor pump (illus.) comprises a cast-iron centrifugal pump fitted with a bronze impeller which is supported outside the pump casing, thus overcoming the usual wear and tear problem caused by abrasive matter in the liquid being pumped. The pump is bolted direct to a suitable continuously rated drip-proof motor. Units are available to deal with from 420 to 3,000 gals. per hour and are capable of vertical suction lifts up to 22ft. (in certain cases 90 ft.). It is perfectly safe to use these pumps for water containing small amounts of abrasive matter, light oils, brine and suds.

A 1-in. diaphragm pumping unit to be shown has been specially designed for dealing with acids and all forms of corrosive liquids and liquids containing solids in suspension. The company manufactures a comprehensive range of automatic float switch controls, both in the non-mercury and mercury types.

Gittings & Hills, Ltd. (B. 324)

Important strides have been made in the wide range of industrial finishes manufactured. The latest types of "Rockhard" synthetic enamels and lacquers require only thirty minutes stoving at 250 deg. F. and are capable of withstanding high temperatures for long periods. Water resistant types have also been developed, while the hardness and wearing qualities of these materials render them applicable to many purposes where more expensive finishes were once employed. For use on meters and other articles which habitually meet with rough usage, materials of special toughness and flexibility are available.

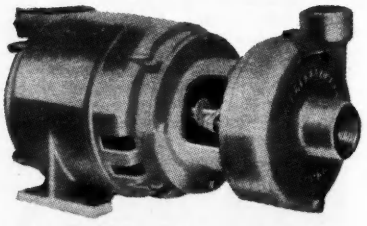
A new factory has been erected to cope with the demand for "Lustreloid" cellulose enamels, particularly dipping cellulose, which is now claimed to be free from discoloration and fast to light. "Metalard" tool and machinery enamels are oilproof and capable of withstanding hard wear, the air-drying time being under four hours. "Amsuline" anti-corrosive coating provides an economical and reliable medium for the painting of steelwork and all metal surfaces, while "Fouramel" liquid wall glaze, being of a hard-wearing nature and easy and economical to apply, is particularly suitable for power houses, offices, showrooms, &c.

James Gordon & Co., Ltd. (Cb. 716)

Electrically operated "Mono" recorders are available for maintaining efficient combustion in all types of boiler plants, industrial furnaces, &c., while the "Igema" distance boiler water level indicator will reproduce the water level in the boiler drum at the firing floor. To illustrate the "Hagan" automatic boiler control system there will be a master regulator for metering the steam pressure, also a diaphragm regulator for metering furnace suction, air-flow, etc., and two servo-motors, one with a 2½ in. by 10 in. power cylinder and the other with a 5in. by 10 in. power cylinder. The "Hagan" pressure regulator with power cylinder attached is used for steam pressure reduction in conjunction with a "Hagan Venturi" throat butterfly valve. Made either for fitting inside the boiler drum or for pipe lines, the "Hagan" steam separator will remove moisture, oil, impurities,, &c., from steam and air. A new patented cooler of the plate type is easy to clean and the heating surface can be increased or reduced if necessary.

Greenwood & Batley, Ltd. (D. 214 & 313)

A complete "Greenbat" screw-making plant operating under normal working conditions will enable visitors to see bolts and screws completely manufactured by the cold heading (or upsetting) process. Two types of cold headers, the open die and solid die (illus. p. 238) will be shown, together with a bolt head trimming machine for trimming cheese-head bolts to hexagon, a thread rolling machine for rolling the screw thread on the shanks of the bolts, and an automatic nut-tapping machine which puts



Girdlestone "F.M." motor pump

the threads on the nuts. Samples of work produced will also be included.

Grosvenor Utilities, Ltd. (Ca. 712)

This company specialises in the re-enamelling of cooker parts. By a new patented process it claims to be able to re-enamel splashers, door panels, oven and hot cupboard interiors, &c., without warpage and to show a considerable saving against the cost of new parts. Also some of the early black cookers can now be satisfactorily vitreous enamelled. The new "Basol" non-caustic cleaner and degreasant is supplied in both crystal and paste forms.

Guest, Keen & Nettlefolds, Ltd. (B. 324)

In addition to screws, bolts, rivets, washers, hooks, eyes, nails, &c., samples will be shown of railway fastenings, tele-

graph ironwork, cast-iron pole fittings, &c., as well as products of the associated company, John Carrington & Sons, Ltd. The many applications of the Nettlefolds & Parker-Kalon hardened self-tapping screws and the Nettlefolds patent Phillips recessed head screws will be seen.

G.W.B. Electric Furnaces, Ltd. (Cb. 204 & 303)

As the electric furnaces manufactured are too large to exhibit, photographs will show typical installations of a fully automatic conveyor furnace and a large roller-hearth furnace both for heat-treating aluminium alloy billets; two slat-conveyor type furnaces (illus.) for annealing cast-iron motor-car pistons; a wire-patenting furnace; two furnaces for annealing brass components incorporating the "Gibbons-Marchant" pusher gear by means of which the furnace charges and discharges itself automatically; a rotary-drum furnace for annealing small brass parts in a controlled atmosphere; an inclined hearth furnace, with mechanical handling gear, to discharge any of three alternative sizes of billet; four box-type furnaces for annealing brass and bronze strip in coils, serviced by a Gibbons-Van-Marle charging machine; and a bell-type furnace for bright annealing coils of wire at temperatures up to 1,100 deg. C.

Hague & McKenzie, Ltd. (Cb. 400)

Additional thick-bottomed utensils specially constructed for hot-plate cooking are continually being placed on the market and are now made in very large diameters for hotels, ships, institutions, hospitals, trains, &c. Altogether there are over 170 different models available.

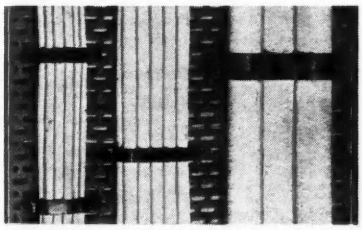
The range of electric kettles has also been extended and they can now be supplied in larger diameters and also in copper, nickel-plated and chromium-plated finishes, as well as in polished aluminium. Electric warming plates, coffee percolators and urns, and a combined inspection lamp and car heater will be shown for the first time.

J. Holden & Co., Ltd. (Cb. 206)

The new "Type 36" electric copying machine will be one of the engineers' drawing office specialities shown.

G. A. Harvey & Co. (London), Ltd. (B. 329)

Specimens will be shown of perforated designs in steel, brass, copper, &c., for



Mild steel cable plate (G. A. Harvey)

radiator and electric heater covers and ventilating panels and grilles; also perforated mild steel cable plates (illus.) for the rapid and economical fixing of electric wires and cables in ships, &c.

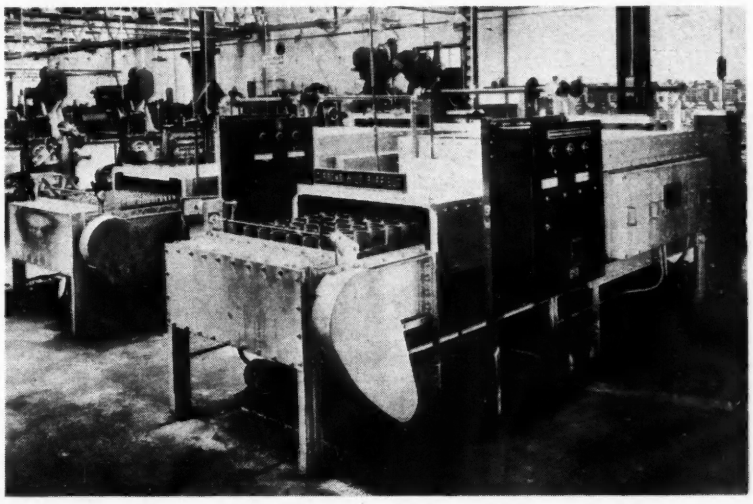
Over 100 cookers a week are prepared by "Basol" degreasant and re-enamelled by the Grosvenor Utilities process at the London J.E.A. renovation shop at Burford, near Dorking

O. C. Hawkes, Ltd. (B. 412)

Special equipment for the bathroom will include two types of cabinets incorporating lighting effects and a range of lighting fittings finished in "Glossite."

L. G. Hawkins & Co., Ltd. (Cb. 609)

Many novel ideas are embodied in an attractive new range of "Supreme" lighting equipment for domestic, commercial and industrial purposes. New models of "Sunray Tricity" heaters are now available and there will also be on view a large assortment of electrical appliances, including the latest "Supreme" hairdriers with sliding control switches, "Beat-a-Brush" and "Ferret" vacuum cleaners, heating pads, illuminated mirrors, high-frequency apparatus, home laundry equipment, kettles, and an improved model of the "Tecal," which is described as "the tea, time, light, call and shaving water robot."



Two G.W.B. slat-conveyor type furnaces

F. C. Heayberd & Co. (Cb. 620)

On a stand treble the size of last year's, one of the main features will be rectifying equipment incorporating metal rectifiers for emergency lighting supply. Battery chargers (illus. right) incorporating metal rectifiers will be shown for all types of charging stations, including those for electric vehicles. Current control, by means of tapped transformers connected to rotary switches, eliminates resistances and increases efficiency. Transformers will be represented by models suitable for welding, lift operation, signs, electro-plating, X-ray, laboratories, etc.

Alfred Herbert, Ltd. (D. 304 & 309)

The "Atritor" unit coal pulveriser (illus. p. 239) will be demonstrated firing two furnaces on the independent feeder system. This system is intended for firing furnaces which are widely scattered and are working spasmodically. Savings obtained by this method over hand-fired furnaces are usually 25 per cent. of the cost of fuel, while the quality of the product from the furnace is greatly improved.

Small tools and accessories will include "Ardoloy" tipped lathe tools, milling cutters, twist drills, reamers, coal-boring bits, adjustable drawing die boxes, self-opening dieheads, air-operated chucks and multigrip friction clutches.

Higgs Motors (Cb. 617)

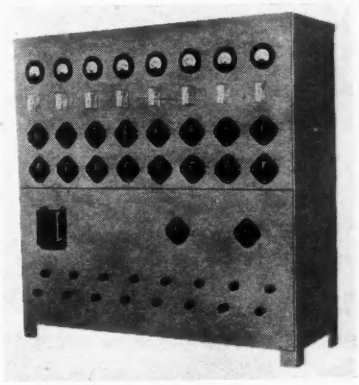
A larger stand than last year's will permit a more comprehensive display of industrial and domestic motors, comprising geared motor units, polishing and grinding motors, small electric tools, etc. Recent developments will include specimens of new fan-cooled, totally enclosed slip-ring and squirrel-cage motors from ½ to 40 h.p. and fractional-h.p. capacitor motors. A cinematograph film will deal with some of the manufacturing processes at the company's works.

Holden & Hunt (Cb. 602 & 703)

A new development in low-voltage resistance welding machines is a 25-kVA continuous-stitch spot welder (illus. p. 237). It has a self-contained 1-h.p. motor, an adjustable pressure spring and toggle gear giving an extremely heavy pressure on a weld. Correct timing of the weld is ensured by the use of a contactor switch controlled by an adjustable commutator fitted on the clutch shaft. The machine, which is also available in 10-, 15- and 40-kVA capacities, can be supplied with a single-speed motor giving up to 180 spots a minute, or with a four-pole change-speed motor with press-button control from 34 to 200 welds per minute.

In a new range of heavy-duty spot welders, available in 5-, 15-, 25-, 40- and 50-kVA capacities, owing to the almost instantaneous welding secured, no timing gear is required. An automatic trip switch is incorporated, and a four- or six-way heating speed box covers the machine's range.

Improvements have been made to the company's 15-kVA spot welder fitted with weld time valveless control gear. The provision of a means for fitting special jigs and stakes and the arrangement of the pedal makes the machine extremely adaptable for handling awkwardly shaped articles. A switch cutting out the timing gear converts the machine into a plain spot welder. "Scadcu" electrode copper alloy is claimed to have a life 6-8 times that of hard electrolytic copper. A range of butt welders—most of them automatic—covers a welding capacity from ½-in. diameter to 1½-in. square. A two-head 16-kW electric rivet-heating machine will be demonstrated.



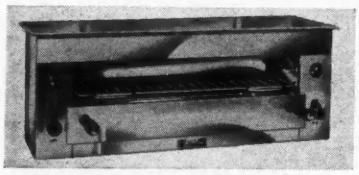
Eight-circuit Heayberd charger

Visitors are invited to test the simplicity of the equipment by making sample welds themselves. On the production side of the firm's business are made such articles as wire oven and refrigerator shelves, lampshade frames and starter gear rings. A new department will enable the output of tinned articles to be increased.

Hotpoint Electric Appliance Co., Ltd. (Cb. 509)

Special attention is called to "Torribar" water-immersion heaters and circu-

lators (illus. p. 235), the high efficiency and low maintenance costs of which are obtained by their unique construction, the heating elements being held centrally in solid-drawn copper tubes by magnesium oxide (a rock-hard substance



Hotpoint snack-bar griller

which is an electrical insulator, but a good conductor of heat).

A complete range of four cookers on view between them cater for the needs of all-sized families. All models can be supplied with "Torribar" radiant boiling plates, some sizes of which are now available as either 3- or 4-heat plates. Where required, in some models, thermostatic oven control can be provided.

Washing machines, vacuum cleaners, kettles, toasters, irons, will also be represented and there will be a large number of new fires introduced since the last Fair. One exhibit of considerable interest in the new high-speed snack bar griller (illus. above), which has two 1,900-W "Torribar" elements, and will cook sausages in 1½ minutes, steak in 4 minutes and chops in 5 minutes. It is finished in polished aluminium and has a grill space 20 in. wide by 8 in. deep.

Charles Hufton & Sons, Ltd. (A. 414)
Electric towel airers and standard lamps will be found among these exhibits.

Hurley Machine Co. (England), Ltd. (B. 632 & 719)
The patent "Super" agitator incorporated in "Thor" electric washers is designed to give a fast yet gentle washing, with the minimum maintenance requirements. The "Model 100," taking 7lb. of dry clothes, is smartly designed and sturdily built, and has a removable and reversible wringer with adjustable tension and instant release. A similar machine (illus. p. 228) holding 9lb. is fitted with the latest "Thor" free-rolling wringer, in which pressure is applied and released automatically when the rollers are started or stopped. Only 264 sq. in. of floor space is required for the "Fold-a-way" ironer.

Hyders (Cb. 722)
Lighting fittings of wrought iron, &c., are available in artistic designs.

I.C.I. (Metals), Ltd. (D. 302 & 403)
The use of copper tubes for electrical conduit work has made considerable progress, and an example of the "Broduit" system will be on view. Demonstrations of copper welding will be given, and "Everdur," an extra strong copper alloy, will be shown in various forms for the manufacture of storage tanks, heaters, &c. Other brass and copper alloys will be in the form of plates, sheets, strip, wire, rods and sections.

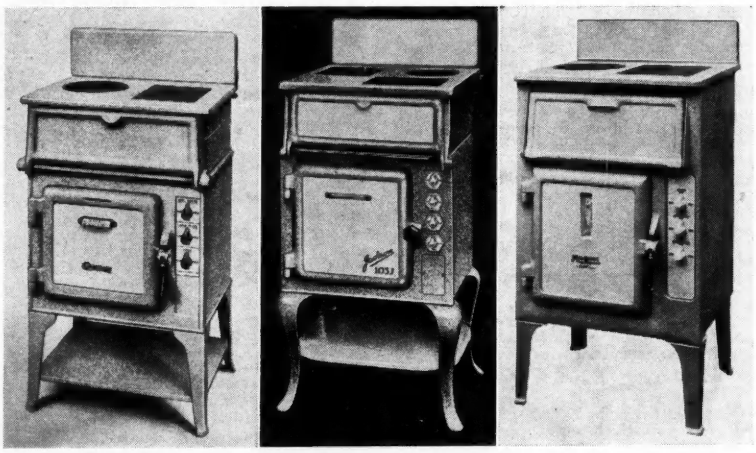
Imperial Chemical Industries, Ltd. (D. 206 & 305)
Visitors are invited to bring samples of their work for case-hardening treatment in a furnace using "Rapideep." Three of the latest degreasing plants will be in operation.

International Refrigerator Co., Ltd. (Cb. 614)
The "Model LA-34" 3.4-cu. ft. B.T.H. refrigerator (illus. p. 236) has a clean streamlined appearance. The hermetically sealed refrigerating unit is mounted in the base and carries a five years' replacement guarantee. The super freezer is of stainless steel and the cabinet inner shell is seamless with vitreous enamel finish. Controls, which include an on/off and defrosting switch and a nine-point temperature regulator, are neatly grouped on a small panel mounted on the front of the super freezer. Although the external dimensions are reduced, this cabinet has the same capacity as the smallest of last year's models.

The exhibit will also include other examples in the range from 3.4 to 9.8 cu. ft., a refrigerator unit in section and pictures of manufacturing operations. On one wall of the stand an enlarged colour diagram indicates the cycle of operation. This company also markets the well-known "Coldrator" commercial refrigeration equipment.

Ioco Rubber & Waterproofing Co., Ltd. (Cb. 624)
This company produces insulation materials of all kinds. Specimens will include "Linapex" cloth, silk and paper; "Formapex" varnish and varnished papers; "Formapex Miocarta" bushings; and oil-resisting sheets and tubes for transformers and switchgear; insulators for tramway overhead lines; and "Ocobind" black adhesive tape.

Jackson Electric Stove Co., Ltd. (Cb. 409)
A complete range of the "90" series cookers, of which 60,000 have been sold during the past year, will be shown in both coloured and mottled grey vitreous enamel finishes. The combination of a "90J" table model cooker with an "F.3" type H.M.V. refrigerator has proved very popular for small kitchens. This cooker can be supplied with a tubular stand with white enamelled shelf arranged between the legs. The recently introduced "100" series



Some of the latest cooker designs: The Carron "Carronade," the Jackson "103J," and the G.E.C. "Magnet D.C.438"

cookers (illus. above) have bottom as well as side elements, and one model will be seen fitted with a thermostat.

Electric fires will be shown in various vitreous enamel finishes. The latest reflector fires with scientifically designed reflectors are available in ¾, 1, 1½ and 2 kW sizes, in blue and gold, and green and gold finishes. Other exhibits will be washboilers, water heaters, &c., together with examples of large cooking apparatus for hotels, hospitals, &c.

Jiffy Automatic Clothes Washer Co., Ltd. (A. 527)
The "Jiffy" hand-operated suction washer is available electrically heated (illus.). A wringer with 16-in. rubber rollers is fitted and all fittings are chromium plated. A choice of attractive finishes is available.

Johnson, Matthey & Co., Ltd. (Cb. 211)
Contact bi-metal, now employed extensively for use in heavy switchgear, will be seen in various forms, and a display has been arranged to indicate some of the types of precious metal catalyst now used and possible adaptations for other purposes. Demonstrations will be given of silver solders and brazing alloys, including "Easy-Flo," "Sil-Fos" and "Plumb-Sol." Very fine tubing shown for the first time will be of interest to manufacturers of electrical apparatus, radio valves, &c. Other products are pure platinum wire for fuse and resistance purposes, superfine resistance wires in nickel, phosphor bronze, copper, &c., fine silver fuse wires, pure silver process plant, and rhodium plating.

H. Kaufmann, Ltd. (A. 506 & 607)
New irons in various finishes and having specially designed handles will be a feature of a comprehensive display of "Phœnix" electrical products, which also include the low-priced "Popular," "Minor," "De Luxe" and "Super Silent" vacuum cleaners.

Knightshades, Ltd. (Cb. 207)
Examples of lampshades of "Lumex" parchment or glass will be shown.

Lacrinoid Products, Ltd. (A. 526a)
Bakelite accessories will include the well-known "No. 333" and "No. 555" heat and light adapters, junction boxes, and switchplates. Lacrinoid torpedo switches are made in a wide range of colours.

Lan-Bar, Ltd. (A. 425)
Among bathroom fittings will be electric towel airers and airing cabinets.

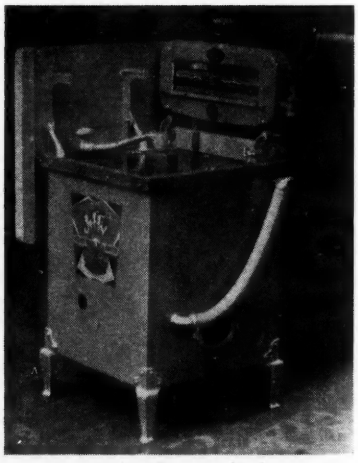
Landale & Co. (B. 213)
A representative display of "Swifsure" electrical tools will be on view.

Ley's Malleable Castings Co., Ltd. (D. 402 & 503)
In the "Black Heart" malleable castings a tensile strength of 24 tons per sq. in. is claimed to be consistently maintained, in contrast with that of the B.S.S. of 20 tons per sq. in. Similarly, its elongation is 18 per cent. instead of 7½ per cent., and its cold bend test is 180 deg. instead of 90 deg. Furthermore, its free cutting properties, due to graphitic carbon and absence of hard spots, permit high machining speeds with reduced tool wear. Typical castings will be shown, together with a selection of Ewart's chains for power transmission.

R. A. Lister & Co., Ltd. (D. 204)
The "Auto-truck" mobile milk bar embodies a ¼-h.p. Kelvinator compressor.

London Aluminium Co., Ltd. (A. 310 and 411)
Special "Diamond" aluminium utensils are made for electric hot-plate use.

London Electric Wire Co., and Smiths, Ltd. (Cb. 612)
One section of this stand will be devoted to all types of insulated wire used for coils. The "Lewcos" enamel and



An electrically heated "Jiffy" washer

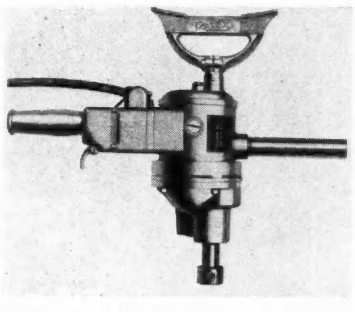
paper-insulated and varnished wire has been specially produced to give a high dielectric strength and high space-factor, while the "Lewbestos" pure asbestos fibre reduces the risk of burn-outs due to heavy loading and permits working to higher temperature rises than other types of insulations. Bell wires, dynamo flexibles, copper braids and telephone cords will also be represented.

Typical products of the associated company, Frederick Smith & Co., will include "Anacos" bare conductors in copper, bronze and cadmium copper in sizes from the finest to overhead power lines and trolley wire. Other manufactures primarily for the electrical industry are rods, bars, rectangles, hexagons, rounds, &c., together with commutator and other special sections in copper and alloys, lightning conductors and the "Anacos" earthing rod.

Joseph Lucas, Ltd. (Cb. 501)

Demonstrations will be given of such car and motor cycle electrical equipment as the compensated voltage control system, the new "Mellotone" and "Posthorn" horns, the "SW4" dual-arm screen-wiper and the latest "Silver King" cycle dynamo set. Armoured positive plates are a feature of the latest batteries for commercial vehicles. C.A.V.-Bosch products will include, in addition to fuel injection equipment, the following items in section: a pump running at 30 r.p.m.; 8in. diam., 24 V, 1,350 W; an axial starter; magneto; windscreen wiper; control board; and a "C.A.V.-Nife" cell.

Visitors will also see both running and sectional "Rotax" electric drills (3/16in. up to 1¼in.), screwdrivers, sanders,



"Rotax" high-frequency heavy-duty wood drill (Lucas)

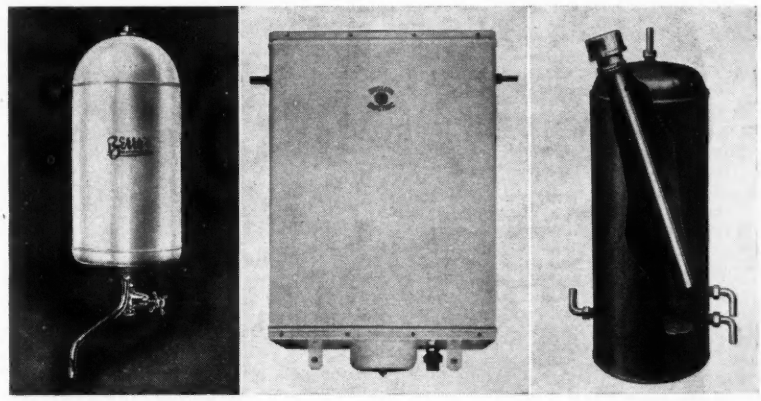
polishers, valve refacers, double-ended bench grinders with adjustable eyeshields, etc. Besides the above universal type tools there will also be a comprehensive display of high frequency tools (illus.) and also aircraft electrical equipment.

MacGregor and McCallum, Ltd. (B. 632 & 719)

Transparent tubs will enable the gyrator action of the "Vogue" (illus. p. 240) and "Mayfair" washing machines and the vacuum-cup action of the "Magic" model to be observed under working conditions. The vacuum-cup action is of particular interest, three nickel-plated cups rising and falling, forcing soapy water and air through the clothes. All models are self-lubricating, and the new Hoover motor employed develops 1/3 h.p. Rotary ironers are supplied for attachment to these machines.

Donald Macpherson, Ltd. (B. 527)

Technical experts will be in attendance to explain recent activities in producing more attractive yet more economical "Foochow" industrial finishes for electrical appliances and apparatus. The development of a one-coat material which is highly efficient in both opacity and gloss and which can be easily applied by ordinary operatives is one of the latest achievements of the company, which has also carried out numerous experiments with the object of standardising film thicknesses and drying times.



Some of the latest water-heating equipment: The "Bellberry" (Berry's Electric), a 5-gal. cistern-type heater (English Electric), and a Hotpoint circulator (in cut-away cylinder)

Mansions Motor Co., Ltd. (D. 708)

Demonstrations will be given of "Kango" and "KB" electric hammers and tools.

Martindale Electric Co., Ltd. (Cb. 606)

A medium grade of the well-known Martindale "Commstones" for truing commutators has been re-introduced, and two sizes of "Commstones" will be shown mounted with special handles, as supplied to the L.P.T.B., etc., for use on trolley-bus driving motors. A new "Commstone" holder (illus.) is primarily intended for grinding narrow commutators and slip rings of all sizes. In addition to the "Jiff-V" undercutter, there will be on view the "Martindale Handy No. 1," a British copy of a similar machine used successfully in America for many years.

An entirely new "Super-Blower," a "Standard" and new "Heavy Duty" electric etcher, the "Junior" grinding tool, road safety signals, a new growler, an improved "Super-Syren" for factories, air-raid warnings, and (with 12-V motor) fire brigades, will be other exhibits. A new type of mask is finding increasing favour as a protection against dust, grinding and spray painting.

M.C.L. and Repetition, Ltd. (D. 406)

Precision repetition products are made from the bar in all metals.

Metalectric Furnaces, Ltd. (D. 502 & 603)

The latest type of lip-tilting, motor-operated crucible furnace (illus. p. 239) for melting aluminium and aluminium alloys, has windings of unique construction, allowing the removal of the elements while the furnace is in use. For general heat treatment up to 1,000 deg. C. a portable furnace of the standard box type is available, while a similar unit is made for laboratory use.

The Metalectric patent recirculated atmosphere fan is incorporated in another furnace for heat treatment up to 600 deg. C, and a model will show the effects of the fan. There will also be a model of the "Metalectric Tagliaferri" arc melting furnace of the 3-phase type for iron, steel and ferro-alloys. Photographs will illustrate other furnaces.

Metlex Industries, Ltd. (A. 322)

New designs in electric table lamps and electrically illuminated bathroom cabinets will be of interest.

Metropolitan-Vickers Electrical Co., Ltd. (Cb. 220)

A typical meter testing equipment to be shown provides for testing and adjusting single and polyphase meters up to 1,000 A at 500 V, and has a capacity of 2 kVA. Indicating instruments of the moving iron, moving coil, dynamometer and induction types, ranging

A new Martindale "Commstone" holder

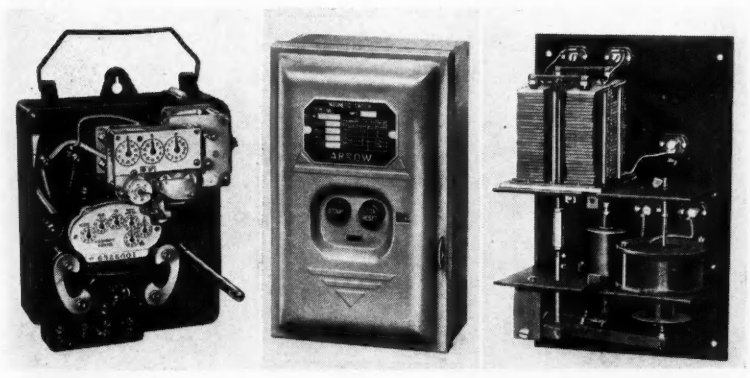
from 2½in. to 24in. in diameter, will meet all commercial and laboratory requirements, while portable sub-standard and laboratory instruments are available for use where high standards of efficiency and accuracy are required.

In the new "PBO" induction type overcurrent relay the inertia and, consequently, the overswing are reduced to remarkably low values. The new "VP" automatic voltage regulator (illus.), intended for use with small a.c. or d.c. generators where extreme accuracy is not necessary, is easy to install, requires little attention, and will maintain the voltage within ± 2½ per cent. of normal from no load to full load. The more elaborate "VC" model will maintain voltage within ± 1 per cent., and will control simultaneously several machines in parallel.

Many varieties of watt-hour meters will be shown.

Midland Fan Co., Ltd. (A. 614)

A complete demonstration paint-spray-



A British Sangamo multi-coin prepayment meter, an Arrow motor-starting switch, and a "Metrovick V.P." automatic voltage regulator for small a.c. or d.c. generators

ing plant will be accompanied by dust-extracting fans and fume-removing fans. A special model of the latter having an extended bearing housing is available for removing fumes under conditions where it is essential that the fumes should not reach the motor.

Midland Metal Spinning Co., Ltd. (Cb. 202)

A special feature will be made of "Tower" super-speed hot-plate cooking utensils.

Midland Vehicles, Ltd. (Cb. 108)

This company makes electric vehicles for local delivery service and works use.

Mirrlees, Bickerton & Day, Ltd., and Mirrlees, Watson Co., Ltd. (B. 322)

Two "No. 10 Mirrlees-Combustioneer" automatic stokers will be seen in operation, one firing a "No. 7 Ruston Thermax" steam-raising boiler and the other a 7-section "Major Robin Hood" boiler. In addition a recently introduced "No. 3½" model, fitted to a sectioned boiler, will demonstrate the method of thermostatic control. All models are entirely self-contained and suitable for burning cheap fuel. Sectional and demonstration models of the "Mirrlees-Imo" screw pumps will indicate their smooth flow even at high speeds and pressures without pulsations or turbulence.

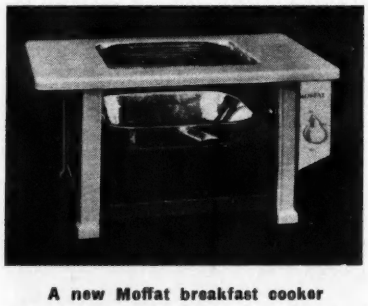
Products of the Mirrlees Watson Co., Ltd., will consist of self-priming, submersible and steam turbine driven centrifugal pumps; and several types of hot water circulators for central heating.

Modern Products (L.C.L.), Ltd. (Cb. 711)

This company, which incorporates the firm of O. Sichel and Co., specialises in industrial photographic apparatus. The "Raidagraf" photo-reproduction machine instantly copies blue prints, books and catalogues without the need for a dark room. Other items are the "Raidaphot" industrial camera and a rotary drying machine.

Moffats, Ltd. (Cb. 511)

Among domestic electric cookers (available in grey and white or attractive



A new Moffat breakfast cooker

colour combinations) will appear a new breakfast cooker (illus.) with a hinged hob fitted with a radiant tubular plate. In the "42M" grill-boiler model, slight improvements have been made to the oven and the loadings modified. The oven doors on the smaller models have been altered to take the shield-type oven heat indicator, and thicker heat insulation is provided.

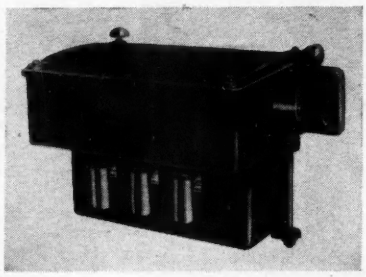
An annealed, nickel-plated copper fitting strip ⅜ in. wide, now fitted to the Moffat cooker, ensures a perfect seal of oven and facilitates reconditioning. A new visor in the "Therm-o-matic" heat regulator, available on all vertical domestic cookers, gives clearer vision and enables pilot lights and oven-door thermometers to be dispensed with.

Modifications have been made in the interior plate and cover of the "Cookquick" stainless-steel semi-radiant type boiling plate, giving greater strength and simplifying rewiring. Minor improvements to the "Redspot" embedded type plate (now available in 8 in., 1,800 W, and 6½ in., 1,000 W sizes) include permanent earthing of the cover. A warming drawer has been added to the "31M" table-top cooker. Features of the de luxe streamline model "265-7" heavy-duty electric cookers are the "stepped-in" base and the hinged hob, which can be raised by a knob on the switch panel.

The three streamline model refrigerators, "M.35," "M.45" and "M.66" have been improved all round and this line has been supplemented by two lower-priced units (illus.) using the same compressor, but having a "Duracote" synthetic finish.

Morecambe Electrical Equipment Co., Ltd. (Cb. 710)

A representative selection of a.c. control gear will include air-break starters for direct starting, star-delta, series-parallel and two-position; air-break combined



Oil-immersed star-delta starter (Morecambe Electrical Equipment Co.)

stator and rotor starters; automatic stator and rotor starters; oil-immersed direct-on and star-delta starters (illus.).

A. E. Morrison & Sons, Ltd. (Cb. 502 and 603)

See "Associated Electric Vehicle Manufacturers, Ltd."

David Moseley & Sons, Ltd. (D. 630)

Among a comprehensive range of mechanical rubber and vulcanite products will be electricians' gloves, rubber lamp standards, hose, flooring, mats, sheeting, tubing, soft rubber rollers, anti-corrosive goods, and ebonite.

Moss Gear Co., Ltd. (D. 420)

This exhibit will comprise fan-cooled worm gear units, both standard and inverted types; geared motors, both single and double reduction; helical gear units, single and double helical teeth; geared pumps; vertical geared motors, and some new crown sleeve-type geared couplings of the standard, mill, extended mill, disengaging, overload slipping and sheering pin types. Turbine gear will be seen driven by motor units, coupled together by the company's mechanic's joint.

National Time Recorder Co., Ltd. (Ca. 205)

The latest development in electric time recorders and clocks is an all-electric, all-metal, fully automatic recorder, capable of printing in one or two colours. It can be used for shift workers and for overlapping times.

James Neill & Co. (Sheffield), Ltd. (D. 527 & 529)

"Eclipse" hack-saws, non-magnetic chucks and permanent magnets are among this company's products.

Newalls Insulation Co.

Examples of heat, cold and sound insulating materials will be on view.

Omes, Ltd (D. 724)

Forgings produced by electrically upsetting the bar before the forging of the shape form this exhibit. The electrically upset forging process possesses many advantages over ordinary forging since finished bars can be used, eliminating practically all machining, and, furthermore, the forgings possess greatly increased strength, as the grain flow of the metal is not shattered or disrupted.

Orme, Evans & Co., Ltd. (Cb. 500)

Shown for the first time will be a single column type electric cooker with one, two, three or four hot plates, an extra large oven and a grill in the top of the oven. Porcelain finishes are available to suit all colour schemes.

"Chillaire" refrigerators (illus.) cater for all households, except the very small flat, the company considering a 5-cu. ft. model the minimum useful size. Both standard and de luxe types are available, among which is the "450" model with two useful drawers at the side.

Osborn Mfg. Co., Ltd. (Cb. 616)

Electric lighting fittings, fires, irons and toasters compose this exhibit.

Ozalid Co., Ltd. (Cb. 707)

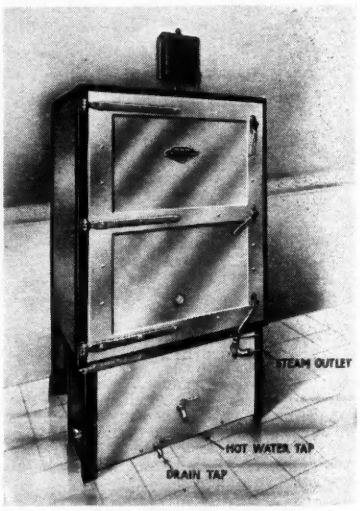
Demonstrations will be given of the new "Victory" horizontal continuous copier (illus. p. 237) which employs mercury vapour lamps instead of arc lamps and thereby eliminates difficulties with carbons, globes, fluctuating current, bad trimming and misuse.

P. B. Sillimanite Co., Ltd. (Cb. 622)

A representative range of electrical refractories made of "Sillimanite" will be exhibited.

Perkins Clean Milk Equipment, Ltd. (A. 625)

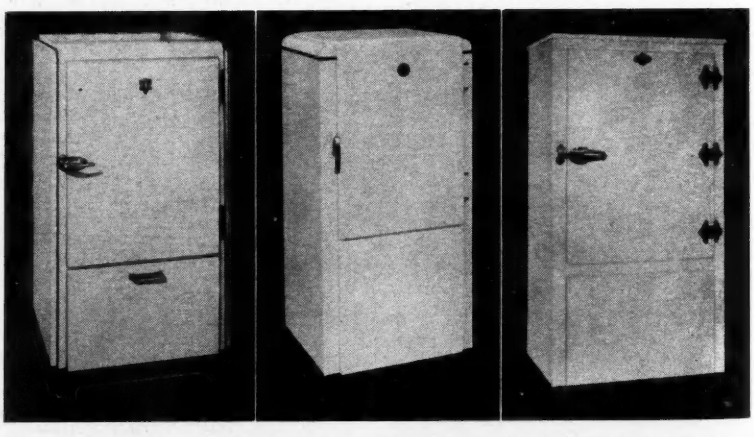
In the 1938 model all-steel electric steriliser (illus.) with separate steam boiler only high-temperature dry steam is allowed to enter the steriliser, thus giving more rapid and more efficient sterilising and better drying of utensils.



Perkins all-steel electric steriliser

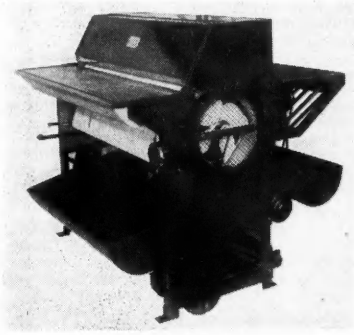
Steam can also be taken direct from the boiler to sterilising churns on a steaming stool of a milking machine without dismantling. Steam can be raised from cold in four minutes, and an automatic cut-out gives protection should the water level become low.

Other items will include the well-



Three of the latest refrigerators: The Moffat "S.63," the B.T.H. "LA.34" (International Refrigerator Co.), and a Chillaire model (Orme Evans)

known "Jubilee" fuel economy boiler with down-draught combustion; the "Duo" bottle-washing machine, which washes 1,000-1,200 bottles an hour and uses only 1 kWh of electricity per 3,600 bottles, and direct expansion refrigeration coolers complete with self-contained sterilising cabinet. Some of these exhibits will probably be among the Derby Corporation's display (A.238 and 339),



Ozalid "Victory" horizontal continuous copier for photoprinting work

while on the stand of Tanks and Drums (A.625) will be the "Safety Cross" fire tube boiler and steel dip galvanised sterilisers with adjustable doors.

Philips Industrial (Cb. 712)

A new spot welding machine of all-welded construction occupies the minimum floor space, absence of projections facilitating grouping. The controls are mounted on insulated panels and the regulating resistance is glass enclosed. Both electrodes are water cooled and the mechanical pressure between the electrodes is governed by an electrically controlled regulator. A time control (illus.) for spot and seam welders will automatically govern the duration of the current and the number of spots per minute. This device is synchronous with the mains and can be readily adjusted.

The extremely smooth and flexible arc obtained from the "1303" welding rectifier makes a very narrow welding bead with minimum distortion. This not only results in very low finishing costs, but also enables a welded joint to be made in sheet metal as thin as 22 s.w.g.

A new development in a.c. rectifying equipment for electricity supply purposes is an iron-clad mercury rectifying valve (illus. p. 238), which combines great strength with the efficient characteristics of the oxide cathode rectifying valve. It is only about one-tenth the size of earlier types of rectifying valves of the same capacity. A recent installation of Philips power factor correction condensers is claimed to have saved £900 in the power bill in one year.

Pinchin, Johnson & Co., Ltd. (B.516 & 619)

Panels will display the company's decorative and industrial finishes.

Poles, Ltd. (Cb. 506 & 607)

Exhibits on this stand will be "Adastra" galvanised steel poles for power transmission, lighting, telephones, &c., climbing shoes and insulators.

Power Centre Co., Ltd. (Cb. 618)

Modern methods of distributing industrial electric power will be of interest, and an improved design of the company's patent turret trunking for multiple cable runs will be seen. Patent bus-bar trunking is being employed for distributing heavy loads over a number of localised points in works, factories, mills, public buildings, &c., the system being especially simple and efficient for ring and rising mains. New unit switchboards (illus.) allow extensions to be made at any time. Adequate wiring space and easy access are features of all the company's equipment.

Pyrotenax, Ltd. (Cb. 112)

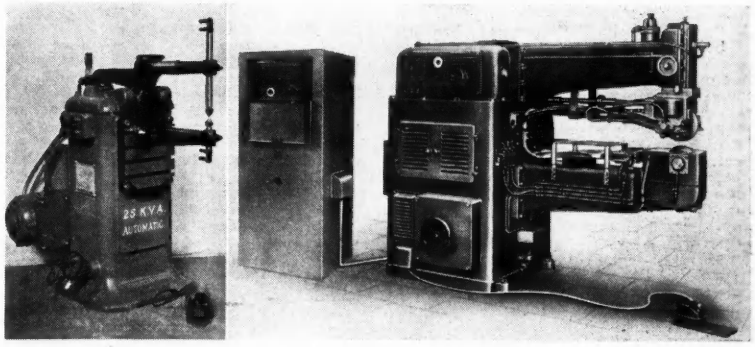
The company's fire-, water- and oil-proof cable is shown passing through boiling water, steam, oil, and molten lead whilst supplying current to a group of lamps. The mechanical abuse to which this cable may be subjected before failure is also demonstrated (see illustration at top of page). It can withstand overloads of 400 to 500 per cent. for considerable periods without the slightest damage. The cables, which are mineral-insulated, copper-covered, and are intended for use with standard electrical fittings, are also shown in various stages of manufacture.

In addition to the standard cables with copper conductors, aluminium cables are already being produced, while heat-resisting alloys for cables for internal connections of cookers, etc., are in experimental manufacture. "Pyrotenax" can be supplied in straight lengths, chromium-plated and polished, or metal sprayed (matt or polished).

Rapid Magnetting Machine Co., Ltd. (Cb. 412)

The new "Multi" self-cleaning chute type magnetic separator (illus. p. 238) is claimed to be the nearest approach to a universal machine yet produced, so far as extraction of loose iron and steel is concerned. An 18-in. belt size model will be shown in operation.

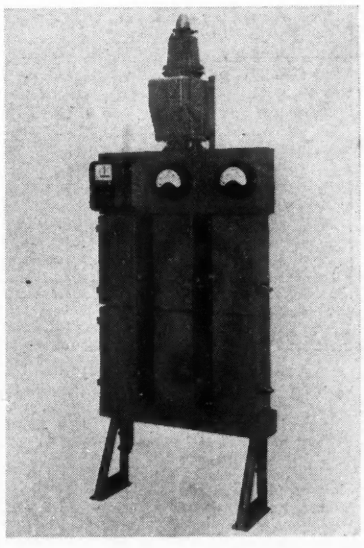
The oval design of the new magnets for suspending over a conveyor belt for extracting "tramp" iron, creates a far more effective magnetic field covering a longer area of greater depth than previous types. Another new product is the portable "Braflux" electro-magnetic drum fitted to a framework with a vibrating feed tray, and the company claims to have made recently the largest electro-magnetic drum in the world. Magnetic separators for dealing with feebly magnetic ores, strip-wound lifting magnets, magnetic chucks and clutches are other specialities of the company.



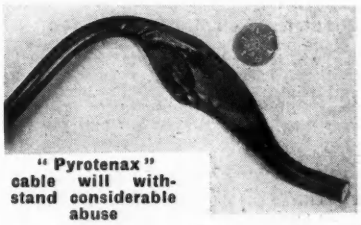
Recent welding developments: A 25-kVA motor-driven automatic spot welder (Holden & Hunt) and a Philips time control unit in use with a seam welder

Rawlplug Co., Ltd. (Cb. 210)

In addition to a full range of the well-known Rawlplug fixing devices there will be two new lines for which the company acts as distributors, namely, the "Gilbert" drill and "Kango" hammer. A 192-page technical handbook, entitled "Modern Fixing Practice," will be available without charge to those interested in fixing problems.



A unit switchboard (Power Centre Co.)



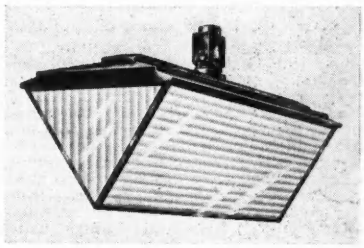
"Pyrotenax" cable will withstand considerable abuse

Redfern's Rubber Works, Ltd. (D. 210)

New ways of adapting and using rubber for protection, suspension, conveyance, insulation, silencing, &c., will be indicated. Moulded, extruded and hand-made rubber and ebonite goods will include special products for the handling of corrosive substances and laminated rubber and ebonite.

Revo Electric Co., Ltd. (Cb. 304 & 405)

Foremost among a comprehensive display of household apparatus will be the company's cookers, further improved and now fitted with the new "Radiant" 3- and 4-heat boiling plates, which have a particularly rapid boiling performance and give even heating over the entire area. In the new "Revostat" automatic oven heat regulator a pilot light as big as a penny has been incorporated in the actual knob of the dial. The device has one hole fixing and is interchangeable with a standard 3-heat switch. It was described in our last week's issue. "Superspeed" open type boiling plates and the enclosed 3- and 4-heat plates will also be exhibited, together with fires, kettles, toasters, washboilers, tubular and panel heaters, boiling rings, &c.



Revo "C.9754" street lantern for horizontal burning mercury or sodium lamps

Particularly interesting developments in street lighting equipment will be fittings (illus.) in which silvered mirror glass is used extensively for horizontal burning sodium and mercury lamps. Street lighting standards of various types will again be shown in the Outdoor Section. Lighting equipment for industrial purposes will include flameproof units for mines and similar dangerous atmospheres. Switch and fusegear, road signs and guard posts, electric fans for home and industrial use, woodwork for electrical purposes, &c., will also find a place.

Revvo Castor Co., Ltd. (D. 331)

Swivel and fixed castors are made for works trucks, domestic and semi-domestic equipment, &c.

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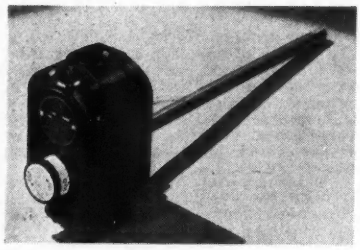
Rheostatic Co., Ltd. (Cb. 310 & 411)

Automatic temperature control apparatus will cover thermostats for electric cookers, water heaters, space heaters, and central heating installations. An improved range of electrically operated valves are completely silent and provide greatly increased power, allowing positive operation under all conditions.

A new control box for coal stokers used in central heating comprises not only main switch fuses and motor starting relay, but has a timing apparatus, which,



A new "Satchwell" central heating boiler thermostat (Rheostatic Co.)

in conjunction with room and boiler thermostats, maintains combustion at the rate necessary to provide the total heat requirements, and also keeps the fire burning when there is no demand for heat.

Among other new devices will be an immersion thermostat (illus.) intended for central heating boilers and industrial applications and suitable for withstanding very adverse working conditions. There will also be the well-known "Satchwell" type "Z" and "Y" immersion thermostats and the type "CS" cooker thermostat.

Robbins and Bradley, Ltd. (Cb. 500a)

Metal fittings and shades of all types will incorporate many new and attractive designs.

Rotax, Ltd. (Cb. 501)

See "Joseph Lucas, Ltd."

Rowlands Electrical Accessories, Ltd. (Cb. 106)

In addition to already well-known standard equipment such as "Realite" shop window lighting fittings, vitreous enamelled reflectors of all types, pressed steel watertight and bulkhead fittings, floodlights and lighting accessories, there will be a large number of new lines, including floodlighting equipment for use with mercury and sodium lamps, shop-window reflectors incorporating mercury discharge and gas-filled lamps for colour correction, and a new range of "Realite" industrial fittings using either gas-filled or mercury lamps. A section of the stand will be devoted to domestic heating appliances, portable fires, inset and panel heaters.

Rubery, Owen & Co., Ltd. (Cb. 705 & D. 602 & 703)

Exceptional economy and extra fast heating are claimed for the "White Knight" electric cooker, an entirely new appliance of simple, compact design, with no projections or dirt traps. The stainless steel oven, which is large enough to roast a 25lb. turkey, reaches 400 deg. F. in less than 11 minutes, and is heated evenly throughout. The door when fully open forms a flat table surface for meat trays, etc., while below there is a drawer for pots and pans. Heating equipment consists of a 1,450-W "Superfast" unit and 1,800-W three-heat radiant plate, with a drawer-type grill chamber beneath.

Exhibits in the Engineering Section will consist of steel pressings, steel-framed motor houses with roll-aside doors, split belt pulleys, shelving, partitions, cupboards, clothes lockers, filing cabinets, &c.; also bright nuts, bolts, &c., in stainless, high tensile, and alloy steels, brass and duralumin.

Runbaken Electrical Products (Cb. 100)

The portable "Easydun" automatic electro-plater (described in our January 28th issue, page 130) works direct off a.c. mains and is designed for garages, makers and repairers of electrical equipment, &c. It will rapidly nickel or chromium plate all kinds of small fittings, an automatic timing control greatly simplifying operation. A model is available working from any 6 or 12-V battery.

Ruston & Hornsby, Ltd (D. 407)

Efficiencies of 80 per cent. and over have been obtained in actual practice with the patent horizontal "Thermax" boiler, a feature of which is a wet-back combustion chamber with a double set of return tubes. The compact model boiler shown has a 3,500 lb. per hr. evaporative capacity and a working pressure of 150 lb. per sq. in. A vertical "Thermax" boiler will be representative of a range extending from 500 to 6,000 lb. per hr. evaporative capacity, while three examples of air receivers to be shown are suitable for the storage of compressed air for starting oil engines, gas engines, &c., and for similar duties. The Ruston boilerworks produces a large variety of special welded and riveted work both in mild and special alloy steels.

Joseph Sankey & Sons, Ltd. (A. 412 & 513)

"Stalloy," "Medium Resistance," "Special Lohys" and "Lohys," are probably the best known of the steels and stampings which have been developed by the company during the past fifty years for use in the electrical industry. A comprehensive selection of laminations and pressings will be seen.

Sellman and Hill, Ltd. (A. 202 and 307)

Aluminium ware for electric cookers will be included in this exhibit.

O. Sichel & Co. (Cb. 711)

See "Modern Products (L.C.L.), Ltd."

Simmonds Aerocessories, Ltd. (D. 421)

The Simmonds elastic stop nut can be locked yet is readily adjusted or removed. A push-pull transmission employed in the Simmonds Corsey control enables substantial loads to be transmitted over considerable distances with high efficiency and minimum backlash. Properties of the company's jointing compound are perfect sealing without hardening, heat-resistance up to 400° F., non-corrodibility and non-solubility.

Simplex Electric Co., Ltd. (Cb. 314 & 415)

Special attention is drawn to the new "Trident" boiling plate, which comprises a resistor, embedded in a highly compressed heat-conducting material within an outer seamless tube of stainless alloy. Red heat is rapidly attained and no special saucepans, etc., are required. The plate is also available as a combined grill-boiler. Another interesting item will be the new "Creda Unit" cooker (see February 4th issue, p. 166), designed for small households, flats, etc., and consisting of three separate components, a breakfast cooker, an oven, and a set of legs.

Among "Creda" water heating devices a new immersion heater, available in both circulating and non-circulating types, has its heating elements entirely enclosed in tubes, so permitting a much higher loading, increased efficiency, and reduced maintenance.

Fires will embody refinements in design and improved coal and flicker effects, and a new convector will be seen, together with irons, kettles, toasters, towel-rails, wash boilers, tubular heaters, etc.

A new under-floor duct wiring system housing all service cables is intended primarily for permanent incorporation in new buildings, and consists of rectangular steel ducts with couplings, junction boxes, etc. The new "Simplex" extension box is useful for premises which frequently undergo structural interior alterations, other new items being a series of watertight combined switch and distribution boards and "Monarch" switches and switch-fuses.

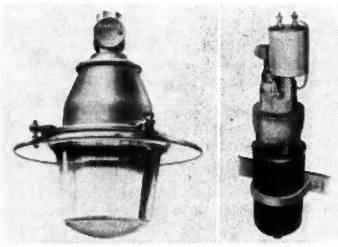
In the new "Refrax" lantern (illus.) for e.d. or filament lamps, reflecting prisms on the "house" side of the refractor bowl not only reduce the brightness in that direction, but augment the main light distribution. The top canopy casting forms a cool wiring chamber with easily accessible porcelain insulating terminals, and a condensation-proof trap is provided. Also to be seen will be a box-form floodlight fitting and two new handlamps, one with a tough rubber body and the other a watertight model.

W. R. Small (Cb. 706)

Pure mica; moulding, flexible and commutator micanite; rings; tubes; segments; washers and mica powder will be among insulation materials on view.

James Smellie, Ltd. (B. 519)

All this company's electric fires, which are marketed under the trade names of



The Simplex "Refrax" lantern and a Philips metal-clad rectifying unit with mercury cathode

"Ivanhoe" and "Cellini," are now fitted with new and highly efficient elements having one-piece formers and stainless steel spring contact clips.

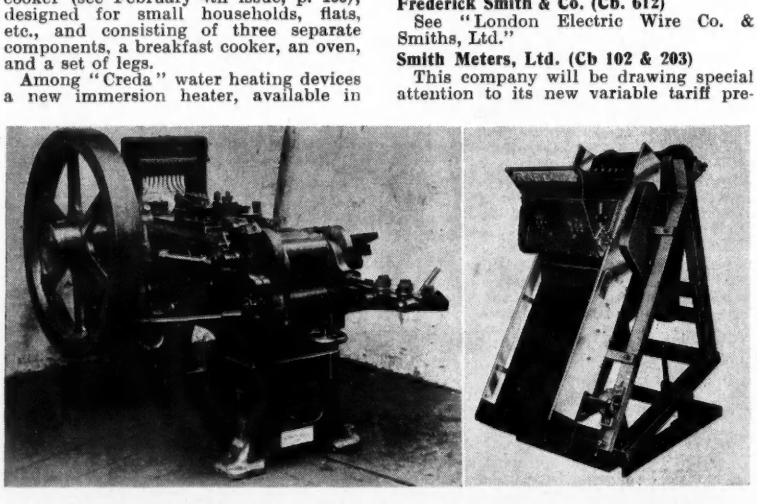
Stainless steel, copper and real bronze fires are specialities of the company, which has a varied range of inset, flush back and screen models (illus., p. 240). Complete fireplaces are supplied, one of the best sellers being a coal grate which can be interchanged with an electric screen fire.

Frederick Smith & Co. (Cb. 612)

See "London Electric Wire Co. & Smiths, Ltd."

Smith Meters, Ltd. (Cb 102 & 203)

This company will be drawing special attention to its new variable tariff pre-payment meter, a feature of which is that in the case of arrears a consumer need not pay off all the outstanding fixed charge before getting his supply. He can obtain a supply at once, but the fixed charge is automatically doubled until the arrears are paid off.



Greenwood & Batley ½-in. solid-die double-stroke cold heading machine and the "Rapid Multi" self-cleaning chute-type magnetic separator (Rapid Magnetting Machine Co.)

Standard and Pochin Bros., Ltd. (B. 420)

The "Stan-Pochin" enclosed elements seen in the company's convectors (illus., p. 226) and unit heaters are designed to give almost indefinite life, since they can-

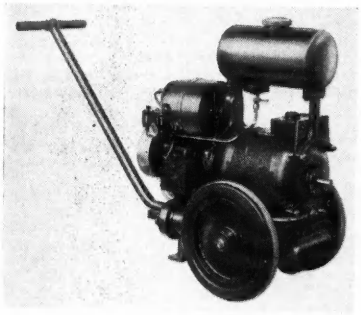
not corrode due to oxidisation. The current carrying wire itself is built up in an embedded shield of magnesium oxide, which is both an electrical insulator and a good heat transmitter. Outside this is a metal sheath which in turn is built into an extended surface radiating tube. This allows freedom of contact between the heating surface and the passing air stream, and is effective in heat dissipation.

Stewarts and Lloyds, Ltd. (D. 400 & 501)
Besides steel tubes up to 54 in. bore, there will be Johnson couplings and loose flange joints, as well as a model demonstrating the flexibility of the "Victaulic" joint. The all-welded "Dawson" joint has now been adopted for steam at 900 lb. pressure and 930 deg. F., and for boiler feed water at 2,300 lb. pressure and 385 deg. F. Different protective coatings will illustrate the present-day practice of protection against corrosion.

Stirling Boiler Co., Ltd. (D. 300 & 401)
See "Babcock & Wilcox, Ltd.

Streetly Manufacturing Co, Ltd. (Cb. 504 & 605)
Examples of plastic mouldings in "Beetle," bakelite, "Scarab" and "Beetle" transparent, to meet customers' special requirements, will include meter cases; electrical fittings, parts and accessories, radio cabinets, knobs and escutcheons, scale parts and electric clock cases. Also exhibited will be standard extruded tubing in "Beetle" and "Scarab," and lampshades made from "Beetle" translucent sheet.

Strong & Co. (Cb. 615)
Tinned sheet steel reflectors and floodlights for all purposes have copper-sealed mirrors arranged to give maximum reflection, patent heat-resisting glass being fitted to the fronts. Ornamental illumination standards, battery-



A 400-W portable petrol-electric generating plant (Tarpen)

operated table lamps and "Stronlite" cycle lamps will also be represented.

W. & S. Summerscales (A. 519)
The "Quiktric" electric wringer is one of this company's products.

Tarpen Engineering Co., Ltd. (Cb. 726)
A 400-W portable petrol electric generating plant (illus.) incorporating a new type of two-stroke engine is especially suitable for agricultural purposes; country house lighting, vacuum cleaning and refrigeration; temporary traffic signal lighting; pumping; portable tool operation; and paint spraying.

Charles Taylor (Birmingham), Ltd. (D. 717)
Specimens of tools will include chucks of the Taylor self-centring, valve and four-jaw independent types; machine vices; brass-finishers' tools and accessories; and capstan lathe toolholders.

Taylor and Challen, Ltd. (D. 409)
The new "1496" press (illus. below) is designed for the internal notching of stator rings up to 11½ in. diam. on the pitch circle of slots, or 14 in. on the outside of the ring. The smallest of three attachments allows rings as small at 2½ in. diam. on the pitch circle to be notched.

The company will also be exhibiting a small automatic coining press, a 70-ton friction screw press, a press for the production of cored articles of brass foundry, and an automatic notching press for chain wheels and sprockets, while a 40-ton open-fronted geared press ("type 1442") will be seen working with a pneumatic cushion fitted to enable deep-drawing operations to be performed.

Taylor and Challen, Ltd. (D. 409)
A multiple electric javelin etching machine (illus.) as employed by manufacturers of cutlery, high-speed engines and plated parts in many other trades, will be in operation. Though the process is applicable to any metal, it is particularly suited to the marking of hardened steel and highly finished stainless-steel products which hitherto have necessitated acid etching. The exceptionally large fields covered, the accuracy of the projected image, and the compactness and rigidity of the design render the company's profile projector invaluable to manufacturers of such electrical equipment as components of armature assemblies which call for fine tolerances.

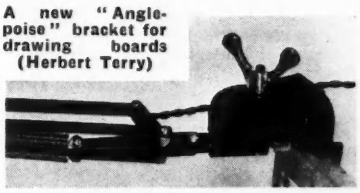
Tecalemit, Ltd. (D. 316 & 415)
An exhibit of lubricating apparatus and accessories will contain examples of the firm's mechanical lubrication systems, all of which enable continuous lubrication to be maintained merely by replenishing containers.

Telegraph Construction & Maintenance Co., Ltd. (Cb. 493)
Specimens of cables will include paper insulated, submarine telegraph and telephone, high frequency and television, and broadcast relay types. "Telconax" protected lead sheathing, plastic tape, plastic compound, backed cotton tape, adhesive foil and Chatterton's compound for insulating cable joints are products well known to electricity supply authorities and contractors.

Various apparatus shown will incorporate the company's high-permeability alloys, "Mumetal," "Radiometal" and "Rhometal," and resistance alloys, "Pyromic" (nickel chromium) and "Calomic" (nickel chromium irons). There will also be a selection of laminations for all types of instruments.

Herbert Terry & Sons, Ltd. (B. 424)
Apart from springs and presswork the company will show "Anglepoise" adjustable lamps, for commercial and domestic use with wall, bench or table

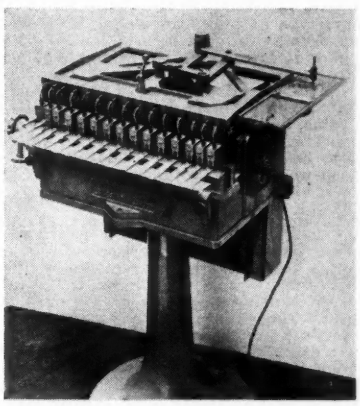
A new "Anglepoise" bracket for drawing boards (Herbert Terry)



mounting; a trolley model; and a new design for drawing boards (illus.).

Bertram Thomas (Cb. 321)
A new greenhouse heater for placing under shelves comprises a low-temperature tubular heater with a large heating surface surmounted by water troughs. A cover protects the troughs from soil, leaves, etc., and acts as a diffusing plate for the water vapour.

The company's electric buffet, a dinner wagon with a thermostatically controlled hot-plate top and electrically heated cupboard, will keep food hot for long periods. The hot-plate top, which is



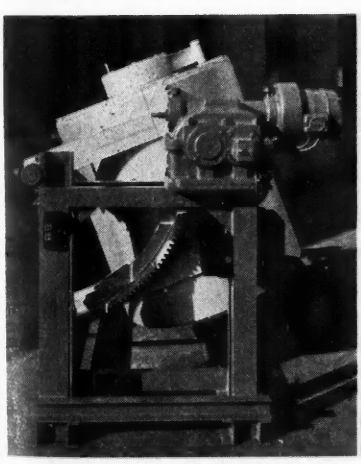
Multiple javelin etching machine with knife-holding fitting for the cutlery trade (Taylor, Taylor & Hobson)

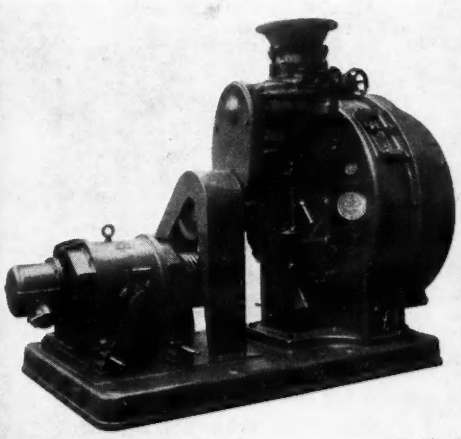
provided with auxiliary plugs for a toaster, etc., is also supplied separately.

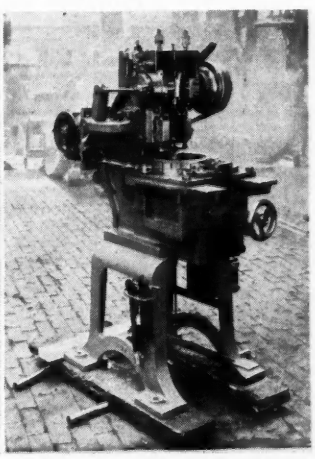
The semi-nesting construction of a neat plate-warming unit results in small overall dimensions.

Composed of two short tubular heaters in a tray, the "Tunnel" motor car heater is intended to be placed on the floor under the engine, while the "Tunnel" skirting heaters owe their rapid heating properties to their single sheet steel casing. A "Tiltrack" steel storage system will indicate another side of the company's activities.

John Thompson Engineering Co., Ltd. (D. 606 & 709)
This company, whose subsidiary companies include John Thompson (Wolverhampton), Ltd., John Thompson Water







A Metalectric crucible furnace for melting, an "Atritor" unit coal pulveriser (Alfred Herbert), and an armature notching press (Taylor & Challen)

Tube Boilers, Ltd., John Thompson (Dudley), Ltd., John Thompson (Triumph Stoker), Ltd., and Wilsons (Glasgow), Ltd., will be showing a self-contained "Super Economic" boiler employing the contra-flow principle of heat exchange and adaptable for all kinds of fuel. It can be either hand- or mechanically-fired, and obviates the necessity for expensive accessories such as economisers and air heaters. Installations of this type of boiler are giving all-round efficiencies of over 80 per cent. The boiler is fitted with a "Triumph F.D." stoker.

The "4470½" fire shown by James Smellie, Ltd., the Carron "Carronaid" and the "Lectracoal 167" (Bratt Colbran)

Examples will be given of fusion welding as applied in the fabrication of boiler drums, and there will be a quarter-scale relief model of a "Beta" type water-tube boiler. A "C" type stoker will be seen working in conjunction with a submerged ash conveyor.

Timmis & Co., Ltd (Cb. 601a)

Recent modernisation of the company's plant enables the production of refractories covering all requirements of the boiler house and all manufacturing industries using electricity as a source of heat. The alumina content of the company's firebricks extends from 32 to 60 per cent., with refractory values from Cone 30 to 36. The chief general characteristics of these bricks is their high density, with consequent high resistance to slag or fuel ash attack, while the adequate and even burning which they receive makes them thoroughly sound without being vitrified or overburnt, with a consequent freedom from spalling. Cements will be shown for jointing, pointing or painting firebrickwork or for ramming or repairing small furnaces.

Tube Products, Ltd. (D. 517)

A full range of electrically welded mild steel tubes from 3⅜in. to ⅜in. o.d. in gauges 5 to 22 s.w.g. will be displayed, together with electrically welded stainless tube from 1½in. to ¼in., and samples of fabricated and manipulated tubes for the electrical and other industries. The stand itself is made largely from chromium-plated electrically welded steel tube.

Turner's Asbestos Cement Co. (Ca. 301)

"Sindanyo" and "Siluminite" asbestos electrical insulating boards and mouldings possess many special features of interest to the electrical engineer. Asbestos cement wall coverings, roofings, ventilating ducts, floors and "Everite" pressure pipes are other products.

United Steel Companies, Ltd. (D. 512 and 613)

Films entitled "The Manufacture and Use of 'Phœnix' (Standardised) Rapid Machining Steel"; "The Manufacture of Workington Hematite Irons"; "The Production of Appleby Plates," &c, will be shown five times daily.

Electric steels have been developed by Samuel Fox & Co., Ltd., one of the company's associates, as a result of the persistent demand for cleaner and better steels, and where requirements are particularly stringent users may take advantage of the "Diamet" code of inspection, under which every stage of manufacture is supervised. Workington hematite irons, made by the company's Workington Iron and Steel Branch, are produced by machine-casting, while the process by which the new "Silver Fox" stainless steels are made ensures a remarkable freedom from non-metallic inclusions with resultant ease of fabrication and resistance to corrosive attack. Specimens of forgings, strip and wire, and "Frodingham-Hoesch" sheet steel piling will also be shown.

Vacuum Oil Co., Ltd. (D. 419)

A complete range of "Gargoyle" lubricating oils and greases will be accompanied by a working exhibit of the well-known "Delvac" mechanical lubricator, of which 15,000 (representing some 75,000 feeds) are in use.

Van Dorn Electric Tools (Cb. 410 & 513)

See "Black and Decker, Ltd."

Vent-Axia (B. 706)

This company's electric fans are made in moulded material to fit in windows, walls, &c.

Vulcanised Fibre, Ltd. (D. 207)

"Castle Fibre" vulcanised material can be made so hard that it is almost impossible to cut it with a saw, or alternatively, so pliable that it can be bent without difficulty. It is extremely light, strong and durable. Samples will be shown in sheet, rod and tube in special shapes and in a wide range of colours.

Waddicor ("Bradite"), Ltd. (Cb. 719)

This company's industrial finishes in super stoving synthetic enamels and the well-known "Bradite" and "Bradsyn" lacquers are used largely for electric fires, water heaters and various electrical components. Many finishes to be shown are of special interest to telephone, radio and recording instrument manufacturers, and several new decorative and protective paints and enamels are available.

C. C. Wakefield & Co., Ltd. (Cb. 301)

Among mechanical lubricators and lubrication appliances for all types of industrial plant a special display will be made of the "DP" type sight-feed mechanical lubricator for Diesel engines, oil engines, &c., as well as the latest chain lubricator.

James Walker & Co., Ltd. (D. 620)

"Lion" packings and jointings for all pressures and temperatures of steam, fluids and gases will adequately meet the most exacting modern demands.

Walmsley Patent Lamp Co., Ltd. (Cb. 721)

Anti-dazzle lamps are a speciality of this company.

H. W. Ward & Co., Ltd. (D. 315)

All the tools, toolholders, chucks and accessories for use on capstan and turret lathes shown are of the very latest design.

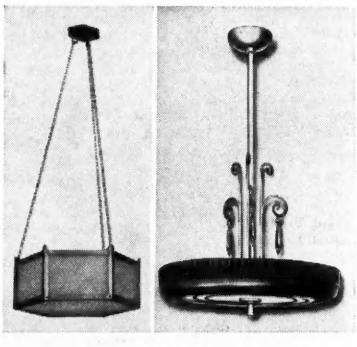
Westinghouse Brake and Signal Co., Ltd. (Cb. 508)

The Westinghouse cinema arc rectifier equipment operates the arcs direct from a.c. mains without ballast resistances, a new ballasting arrangement giving a very high efficiency and power factor and resulting in a saving of over half the running costs in most cases.

Other demonstrations will illustrate the versatility of the Westinghouse metal rectifier for electro-plating (illus. p. 230), circuit-breaker operation, battery charging and trickle charging, and the operation of automatic weighing machines, shaker screens, magnetic separators, fire alarms and electric clocks. In the electro-plating demonstration an input wattmeter will indicate the high efficiency of the rectifier, while an instrument panel mounted on the vat will show the excellent control effected by new auto-transformers giving no fewer than sixty-four different outputs. Reliability and ease of operation are features of the company's chargers for electric vehicle batteries.

Wilcox & Pitman, Ltd. (A. 408)

Original designs of lighting pendants (illus. below), standards and table lamps incorporate glassware available in many attractive colours.

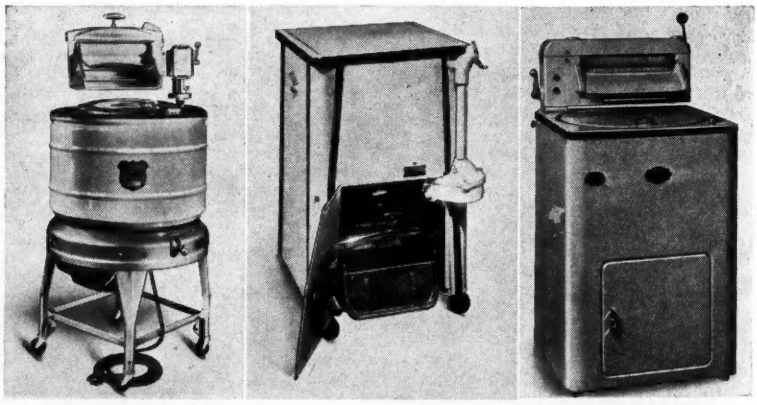


A new lighting fitting by Wilcox & Pitman and (right) Berry's "Cristobel" pendant

Wild-Barfield Electric Furnaces, Ltd. (Cb. 204 & 303)

Muffle furnaces ranging from small tube furnaces to rectangular, oval and vertical types are comparatively low-priced, but are economical to run and have a long life. They are particularly suitable for laboratory work and for hardening small tools when a large output is not required. The design of the company's high-speed steel-hardening furnaces, two types of which will be shown, has been improved so that now all door-operating gear and pipework for the "Counterscale-curtain" atmosphere control are concealed inside the case. Both furnaces are available with manual, electrical or pneumatic door operation, positive sealing of the door being ensured. The preheating furnace of the "Hairpin-Minor" type is also used for production, hardening, carburising, annealing, etc.

Similar to the well-known "Heavy



A further selection of washers: The "Vogue" (MacGregor & McCallum), the "Bedal Cabinet" machine (British Electric Domestic Appliances), and the Servis Model F" (Wilkins & Mitchell)

Hairpin" furnace, the "Tubular Hairpin" model has tubular elements enabling them to be used up to 1,150 deg. C. As representative of vertical forced air circulation furnaces, there will be two models, one intended particularly for toolroom work, and the other the smallest production size, fitted with a charge progress recorder. A pusher furnace will be an example of special purpose equipment. Vickers hardness testing machines will accurately test a wide range of sizes and hardnesses of materials. Most of the furnaces wil be seen in operation.

Wilkins and Mitchell (Cb. 604)
A clean "no-corner" exterior, a removable wringer which can be stowed away in a compartment at the base, a double-end drip tray, a quick-pressure release on the wringer rollers, conveniently placed controls, and self-lubricating bearings are a few of the features of the "Servis" cabinet washing machine, model "F" (illus. p. 240).

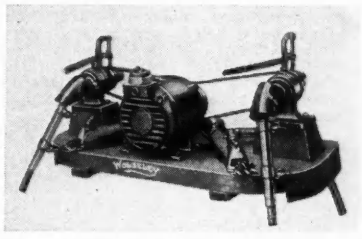
Williams (Birmingham), Ltd. (A. 312 & 413)
This company intends to show a wide selection of special flat base "Atlas" electric cooking utensils.

Thomas Winston, Ltd. (A. 494)
An attractive illuminated reflector screen fire, a 2-kW parabolic reflector fire with a floodlit reflector, several new portable reflector fires, new aluminium ware, and an electric kettle incorporating an immersion element and an automatic cut-out will be among recent additions to the "Pearl" range of domestic appliances. The new "Jury" electric iron is well finished and is sold at a low price. Lighting fittings shown will include pendants, brackets and table lamps of pleasing design and finish.

Wolseley Sheep Shearing Machine Co., Ltd. (D. 705)
Representative of the company's range of electrically operated horse and cattle clipping machines will be a two-bracket portable sheep shearer (illus.), the "Senior" pendant sheep shearer, and a "Junior" pendant and "Clipkit" horse clippers.

Worksop Corporation Electricity Department (Cb. 715 & 717)
An attractive display has been prepared for the purpose of attracting new industries to the borough.

Yorkshire Copper Works, Ltd. (B. 630 & 717)
A pylon of condenser tubes in cupronickel 70/30 alloy and also "Yorcalbro" (aluminium brass) condenser tubes will be a prominent feature of this exhibit. The company's research laboratories investigate the causes of the corrosion of



Wolseley two-bracket electric sheep shearer

condenser tubes in service, and furnish reports without charge or obligation.

Young Accumulator Co. (1929), Ltd. (Cb. 608)
Batteries are available for every purpose, including electric traction, private cars, Diesel-engined and other commercial vehicles, ships, aeroplanes, and house lighting. Sectional units and covers will be on view.

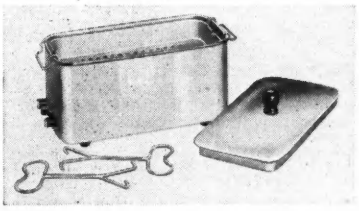
London Exhibits

A.B.E.C., Ltd. (D. 1151)
All kinds of clocks, time switches and instruments will be shown on this stand.

Air-Glow Lights, Ltd. (C. 1039)
A feature of the "Air-glow" signs is the bubbles which travel along the illuminated letters, thereby giving continual movement to arrest the eye.

Aladdin Industries, Ltd. (F. 1362)
Table and floor standards of all descriptions will be exhibited, as well as reading lamps and pottery lamps.

Allen and Hanburys, Ltd. (A. 642 and A. 644)
Exhibits will include hospital operation tables, high pressure steam sterilisers for dressings, and stainless steel

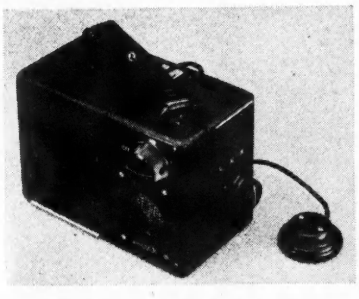


Allen & Hanbury's steriliser

sterilisers for instruments, utensils, water and saline, all electrically heated. A steriliser is illustrated above.

H. J. Alter (D. 1106)
Advertising signs will be a speciality. These will include the "Advertclock," which combines a clock with a moving illuminated sign, a turntable, a horizontal illuminated revolving sign, and luminous alphabet signs.

Amplivox, Ltd. (A. 663)
In addition to the standard range of instruments there will be special apparatus for schools and churches. A typical

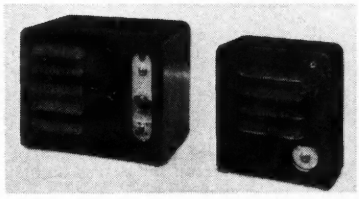


"DT8" Amplivox deaf aid unit

installation consists of piezo-electric crystal microphones, one for each group of four deaf people, so that they may hear their own voices as well as that of the teacher. Each pair of earphones is separately controlled for tone and volume. The amplifier is fitted for radio, gramophone and microphone amplification. A new product will be a device to enable a deaf person to listen directly to a radio set by means of the same earphone as is used with the hearing aid. The "DT8" unit is shown in the preceding column.

Anstey and Wilson, Ltd. (E. 1209)
Electric table lamps will be included among this company's exhibits.

Ardente Acoustic Laboratories, Ltd. (A. 655 & A. 661)
Among the sound systems to be exhibited on this stand are a 10-W amplifier and electric gramophone turntable, a "VR/HB" ribbon microphone on a floor stand, and a loud speaker which will form a small public address system. The main feature, however, will be various types of intercommunication systems.



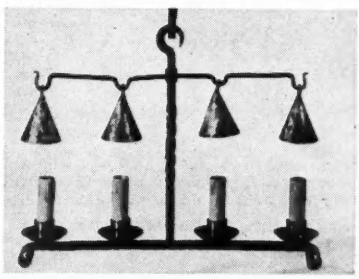
"Ardente" microphone and loudspeaker

H. E. Ashdown, Ltd. (A. 677)
A variety of plastic mouldings will be on view on this stand.

Baird Television, Ltd. (A. 709)
A comprehensive range of television receivers and equipment will be shown, including models T.11 and T.12 and T.14 (illus.). Demonstrations will be given daily on the stand by actual radio reception of the B.B.C. tranmissions. A rack for television and all-wave relay reception in flats will be shown, together with a complete layout for a modern block of flats. Vision and sound are provided "on tap" in any room desired. Another development is the "Multiplier" photo-electric cell, of which there are three types. Cathode sensitivity is approximately 30 microamps per lumen. These cells are suitable for all television and sound-on-film work. Television lecture equipment for use in colleges and technical schools will also be on view.

Bakelite, Ltd. (A. 684 and Earls Court, 560)
Synthetic resin products, moulding materials, varnishes, lacquers, cements, spirit and oil soluble resins, laminated sheet, rod and tube will be exhibited. At Earls Court "Trefoil" bakelite and "Artmur" veneers will be shown in the furnishing section.

C. Baker (E. 635 & 651)
Exhibiting on the United Scientific Instrument stand, the company will show

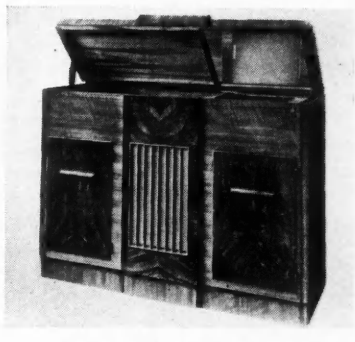


A period wrought iron fitting by the Belgrave Electric Co.

microscopes for all purposes, and an electrically operated "Smith" wear and lubricant tester.

Baker Platinum, Ltd. (E. 1213)
The exhibit will include a range of contacts in precious metals and their alloys, embracing a variety of types in common demand. Thermo-element wires, resistance wires, nickel strip, composite metal and precious metals in all forms required by the electrical industry will be shown.

Belgrave Electric Co., Ltd. (F. 1306)
There will be a display of hand-wrought iron electric lighting fittings and furniture, including floor standards, table standards, wall brackets and pendants. All types of lampshades in new



Baird T.14 television receiver

materials with hand-painted designs will be shown, also electric clocks in pottery, wood and wrought iron in many novel designs. The "Jacobean" group consisting of wrought-iron two-, three- and four-light pendants with wall brackets to match in armour bright finish are ideal fittings for country houses. New real skin candle shades with leather thonging and hand-painted designs are especially suitable for period wrought-iron and wood fittings.

Bentima Co., Ltd. (D. 1145)
Synchronous electric models will be included among the clocks exhibited.

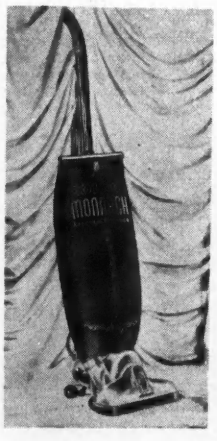
O. D. Binger (Sales Aids), Ltd. (D. 1112a)
This company's stand comprises electrical animated advertising signs of all kinds, including an automatic book, the leaves of which turn over, a moving pig, a kicking baby, and a moving presentation of the "Quins."

British Alabaster and Arts Co., Ltd. (F. 1395)
Among other things a new range of table lamps with china and metal figures and specially designed shades will be shown, also a new range of panel lamps mounted with various figures, and a range of lighting bowls of modern design. A specially lighted electric wall clock and vase lamps with interior lighting will also be on view.

British Electric Domestic Appliances, Ltd. (G. 1526)
See description of exhibits at Birmingham.

British Plastics Federation, Ltd. (A. 711)
The Plastics Section will be of uniform design and appearance, and has been transferred from the gallery to the ground floor of the Grand Hall. The Federation's stand will be trebled in size, and in addition to the usual office accommodation will include a special composite exhibit to show the general public what exactly plastics are and how they are made.

British Vacuum Cleaner and Engineering Co., Ltd. (G. 1523 & D. 1139)
There will be a wide range of vacuum cleaners of both the internal and external dust-bag types. Several new features are incorporated in the "Goblin Ace," and a carpet vibrator has been fitted to the "Monarch." "Floating agitation" is employed in the new "Beautility" washer. A full range of "Goblin" clocks will be on view on stand D. 1139.



British Vacuum Cleaner Co.'s "Goblin Monarch" now has a carpet agitator

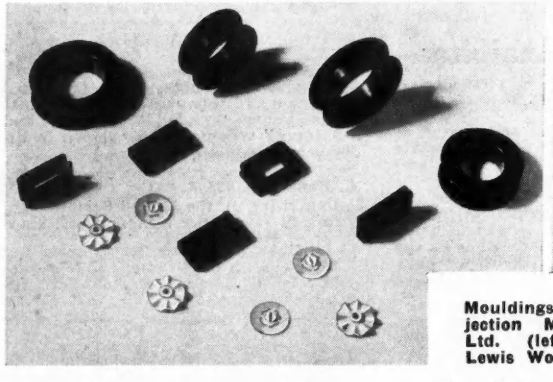
J. A. Brook, Ltd. (E. 1207)
The "Lox-all" universal lamp lock will again be exhibited. The latest model supersedes all the previous locks on account of its being applicable to all types of bayonet slot lampholder.

Burton Holt (Chelsea), Ltd. (F. 1330)
A special feature will be made of table standards in artificial stone finished in any colour required, with 9in. thonged shades to match in colour and finish. The weight gives great stability. Bed lamps will also be shown.

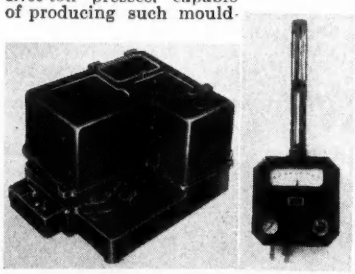
Bylock Electrics, Ltd. (G. 1528)
The exhibits will include a wide range of vacuum cleaners of the cylindrical type, and low-priced hair dryers with either metal or bakelite casing. Among the new equipment will be a low-priced electric cleaner, electrically heated blankets and cushions.

Catalin, Ltd. (A. 683)
The new cast synthetic resin known as "Catalin" will be shown in the form of table-lamp standards and shades.

E. K. Cole, Ltd. (A. 702)
The company is exhibiting for the first time since it began to accept outside work on a large scale, and large photomurals will show an aerial view of its 300,000 sq. ft. factory and illustrate the 1,700-ton presses, capable of producing such mouldings as table-tops, radio receiver cabinets and heater casings. The exhibits will show the capabilities of the plant more than articles already in production. Industrial mouldings on view will include prepayment meters (illus.), junction boxes, sealing chambers, power plugs and sockets, fuse boxes, plug adaptors, tumbler switches, cut-outs and fuse holders, h.f. suppressor tubes, transformer bobbins, knobs and switch handles. The "Thermovent" convector heater will be shown for the first time.



Mouldings by Injection Moulders, Ltd. (left) and Lewis Woolf, Ltd.



Ekco prepayment slot meter moulding and Short & Mason indicating humidity controller

Combined Optical Industries, Ltd. (A. 712)
New transparent mouldings are used for ophthalmic lenses, simple lenses, optical flats and prisms and non-optical articles such as illuminated dials and panels.

T. P. Cook & Co., Ltd. (F. 1416, and Earls Court 187)
Exhibits at both Olympia and Earls Court will include a large range of table and floor standards and various electrical novelties.

T. H. and J. Daniels, Ltd. (A. 682)
Electric heating and drive can be employed for the synthetic resin moulding plant which will be shown.

Thomas De La Rue & Co., Ltd. (A. 696 and 704)
As in previous years mouldings for the electrical industry will form the major part of the display. These will include radio cabinets, hair dryers, telephones, line insulators and terminal blocks, ignition coil cases, coil formers, lightning protector insulators, fan housings, fan rotors, telephone relay parts, etc.

Dernier and Hamlyn, Ltd. (F. 1401)
A new range of lampshades in silk, vellum or fancy materials, and lamp standards, will be on view. One of these new types is illustrated on page 243.

Dictograph Telephones, Ltd. (F. 1324)
Loudspeaking and intercommunicating telephones for offices, works, hotels and hospitals will be displayed on this stand.

Dominion Electrical Co., Ltd. (C. 1036)
There will be a new type of sign with a continual colour change, giving the appearance of a change in design and lettering, as well as "Silverice" balls for cooling drinks. These are used in conjunction with a refrigerator.

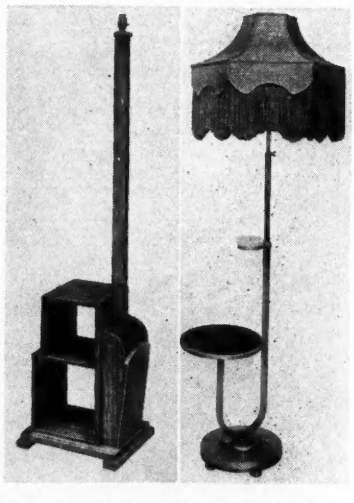
J. M. Doughty & Sons, Ltd. (Earls Court, 169)
Electric lighting fittings, table standards and floor standards will be among this company's furnishing exhibits.

Ebonestos Insulators, Ltd. (A. 697)
The display will include a large range of mouldings of special interest to the electrical industry.

Edgware Shade Co. (F. 1308)
A large range of table standards and shades similar to that shown in the illustration on the next page will be on view.

Electric Art Shades (1928), Ltd. (F. 1437)
Table standards to be shown will include a number of novelties and a clip-on lamp for vases.

F. W. Elliott, Ltd. (D. 1144)
Many examples of both modern and antique clock cabinet work will be on view as well as some new inexpensive



Floor standards by T. P. Cook (left) and Walker Fender Co.

lines; the clocks can be fitted with synchronous movements.

Elliott and Spear, Ltd. (F. 1365)
Lamp shades and table lamps will be a speciality.

A. E. Foster (F. 1334)
Wooden floor standard lamps will be displayed on this stand.

General Chemical and Pharmaceutical Co., Ltd. (A. 692)
The exhibit will include several chemicals of industrial importance, notably "Oasis" accumulator acid and distilled water, potash electrolyte for nickel-iron batteries, together with chemicals for use in electro-plating industries and marketed under the registered trade mark of "Vulcan."

G. M. C. Mouldings, Ltd. (A. 700)
Displayed on this stand will be bakelite mouldings, such as meter cases, bobbins, transformer cases, parts for electrical switchgear, electric lighting systems, junction boxes, vacuum cleaner parts and refrigerator lids.

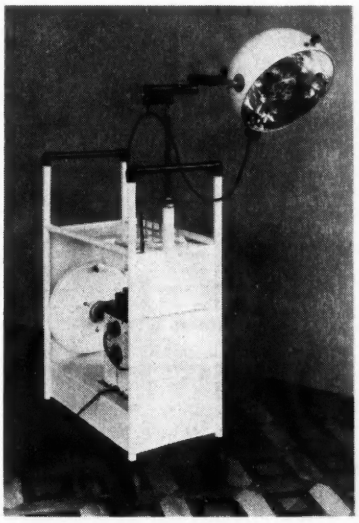
Grimshaw, Baxter, and J. J. Elliott, Ltd. (D. 1148)
All kinds of clocks, both mechanical and electric, will be shown.

Hanovia, Ltd. (A. 656-660)
Included among the exhibits will be the "Homesun" ultra-violet ray lamp and several new types of medical lamps —a ward model (illus.) which can be wheeled about; the "Kromayer" lamp (model IV) in which a complete water cooling system and electrical control gear are mounted on a trolley carrying the focal therapy burner; the "Centrosol," a powerful actinic lamp for collective irradiation in clinics; and the "Sollux" (model V), a new type of infra-red lamp.

Adam Hilger, Ltd. (A. 613)
Among the scientific apparatus which will be on view, the complete spectrographic outfit and "Dexrae" industrial X-ray outfit are of interest. A convenient photo-electric instrument for carrying out colorimetric analyses in the "Spekker" photo-electric absorptiometer and the "Donaldson" trichomatic colorimeter is another development.

Hoover, Ltd. (G. 1525)
On the company's stand will be some of the laboratory equipment used in testing cleaners, including two exhibits designed to illustrate the action of the agitator on a piece of Wilton carpet. The most interesting of these devices will show the beating action by means of an oscillating beam of light, and the other enables the person operating the device to witness a piece of carpet being scientifically beaten in slow-motion. In addition, the full range of cleaners will be on show.

F. A. Hughes & Co., Ltd. (A. 703)
The stand, devoted to plastic materials,



Hanovia ward type ultra-violet lamp

will contain examples of "Rockite" thermo-setting synthetic moulding compounds and impregnating and laminating resins for high grade insulation, and also injection mouldings manufactured from "Cellomold," including coil bobbins, switch dollies, etc. A comparatively new thermoplastic resin of the polyvinyl chloride type will be represented by a display of cables and wires which have been insulated and sheathed with "Mipolam," and insulating sleevings produced from this material.

Ideal Home Electrical Appliances, Ltd. (A. 657)
Various kinds of medical appliances will be shown, such as portable violet-ray, high-frequency vitalators and ozonisers, and radiant light and heat apparatus.

Injection Moulders, Ltd. (A. 679)
The mouldings which will be of particular interest to the electrical industry are condenser cases, four sizes of electrical bobbins (illus.) and electric clock movements, all in a transparent material.

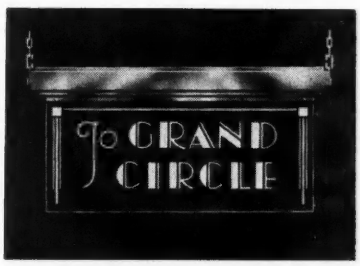
Insulators, Ltd. (A. 698)
Various mouldings include applications to the electrical industry, an example of precision moulding being the electric organ discs.

Jaffe and Rose (F. 1328)
Table lamps, figure lamps, etc., will constitute this exhibit.

Johnson Matthey & Co., Ltd. (E. 1240)
See description of exhibits at Birmingham.

Kent Mouldings (A. 701)
This comprehensive selection of high-grade mouldings is of particular interest to those engaged in the manufacture of telephone, telegraph, electrical and radio apparatus. The exhibits will include junction sealing chambers and cable terminals for multi-way telephone cables, telephone parts, switch and fuse block covers, terminal strips, insulators, bobbins for various types of coils, radio valve-holders and bases, escutcheons for tuning dials, control knobs, and tubular condenser cases and caps.

K.F.M. Engineering Co., Ltd. (D. 1135)
"Internalite" clocks, which are specially suitable for cinema auditoriums and business premises will be on view. In addition the "Internalite" directional signs (illus.), of which the company is patentee, will be on view. Illumination of the lettering on the glass is obtained



K.F.M. "Internalite" sign

from a strip light along the edge of the sign.

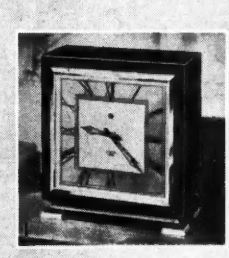
E. and J. Leek, Ltd. (E. 1236)
In addition to table ware there will be a display of unusual table lamps.

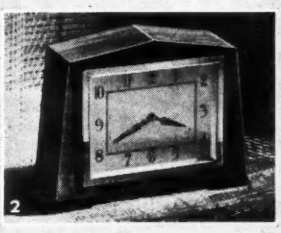
London Electric Clock Co., Ltd. (D. 1138)
Inset clocks for flush fitting and all types of designs for domestic and commercial use, advertising clocks and glass clocks, all fitted with synchronous electric movements, will be shown.

W. Lusty & Sons, Ltd. (Earls Court, 568)
In the furnishing section will be a range of "Brolus" lamps and art ware.

Lighting Units and Clocks at the London Fair

1. Smith's English Clocks, Ltd. (The "Taw")
2. Mallinson & Eckersley, Ltd.
3. British Alabaster and Arts Co.
4. T. Webb & Sons
5. Dernier & Hamlyn, Ltd.
6. Edgware Shades
7. Stadium, Ltd. (The "Nearlight")





Mallinson and Eckersley, Ltd. (F. 1303)
In connection with the electrical trade the exhibit this year will include standard lamps with and without a shelf tray, table and desk lamps in a variety of woods, clocks (illus.) in special wooden cases, a bedside lamp with inset clock, a firescreen and electric radiator, and battery-operated dining table lamps.

Mayfair Shades (F.1430)
There will be on view a new range of lighting equipment, including table lamps in china, glass and pottery.

National Clock Manufacturing Co., Ltd. (D. 1140)
In addition to the company's present range of clocks there will be new designs in mirror clocks, combined table lamps and clocks, and a new range of low-priced clocks to compete with imported models.

Mouldrite, Ltd. (A. 676-685)
The raw materials for the manufacture of plastics, including phenol-formaldehyde, urea formaldehyde and acrylic moulding powders and resins will be shown and articles made from them displayed on counters constructed from laminated plastics. Examples of the new G.P.O. coloured telephones made from "Diakon" will be arranged at the base of a "Perspex" transparent sphere.

New Welbeck, Ltd. (G. 1527)
Since last year's Fair a new cylinder vacuum cleaner type model has been introduced in addition to the existing "Master" canister type. Although considerably lower in price, it incorporates the double-action retractable rotary brush nozzle. The new "Maxwaxa" can be used on either cleaner for the application of wax or polishing.

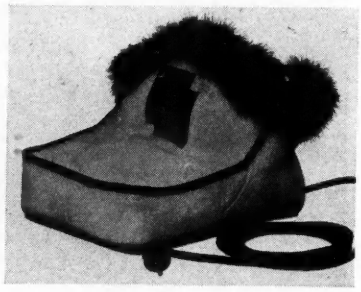
Norma Technical Products, Ltd. (E 1206)
The "Telerazor" will again be shown. This employs a rapidly oscillating blade which is operated by a battery in the handle.

Orel-Micro Electric, Ltd. (E.1225)
The "Clipshave" electric dry shaver will be shown on this stand.

A. J. Pepper & Co., Ltd. (D. 1121)
Novelties in model lamps will be shown in addition to table standards.

Shelley Potteries, Ltd. (C. 1076 and C. 1049)
Having for many years supplied pottery for table lamps the company is now making its own models, which will be on view at Olympia.

Short and Mason, Ltd. (A. 653)
A wide range of industrial and scientific instruments will be shown on this stand, including automatic controllers for maintaining temperature, pressure, humidity (illus. page 242), and rate of flow. These are available in three types, viz., indicating, indicating and controlling or recording and controlling. The



Thermega foot muff

"Fulscope" mechanism is incorporated permitting the instruments to be adjusted to time-lag.

Smith's English Clocks, Ltd. (D. 1151)
Practically every conceivable type of timekeeper in commercial production will be seen at the company's stand (illus.) including bathroom and kitchen models and some new ideas in casing arrangements. Pastel-shade finishes are now available as well as period designs and a new range of chrome and glass models.

Speights, Ltd. (F. 1428)
Many new designs in table lamps and shades will be on view, and these will include the flounced French type of shade as well as inexpensive silk shades.

Stadium, Ltd. (H. 1629)
Of greatest interest is the "Nearlight," a small portable lamp and reflector (fitted with a wire guard) which is mounted on a double ball-jointed arm and will clip with a non-slip grip to any convenient place. Low-priced table lamps and torches will also be on view as well as electrical accessories for cars and cycles.

I. and M. Steiner, Ltd. (G. 1502a)
The "Stesco" heater, for providing instantaneous hot water from a tap will be this company's principal exhibit. A 1½-lb. travelling iron and combined heat and light adaptors will also be shown.

H. W. Sullivan, Ltd. (A. 646)
Among a wide range of instruments to be exhibited are screened sub-standard wavemeters, high permanence inductance standards, adjustable inductance standards, precision inductance bridges, precision adjustable mica condensers, inexpensive fixed valve mica condensers, simple capacitance test sets and screened non-active resistances.

Thermega, Ltd. (A. 659)
New to the Fair will be an electric foot muff (illus.) loaded at 48 W and suitable for operation from a car battery. Heating pads, which will also be shown, have thermostats of the vacuum-tube type, the different temperatures being obtained from a single circuit. Automatically controlled single-heat blankets are also supplied.

Tintometer, Ltd. (A. 654)
The "Lovibond" tintometer, for measuring and recording the colour of liquid or solid materials, complete with white-light attachment, for working under carefully standardised conditions, will be shown on the stand with a new white oils tintometer for measuring and standardising the colour of water-white liquids.

Union Radio Co., Ltd. (A. 741)
The chief exhibits will be all-wave and short-wave radio receivers, including 7- and 8-valve superheterodyne receivers and a battery model. A number of units of the SW6/M8 type can be operated adjacent to each other in one receiving station room and from a common aerial and common power supply with freedom from interference as between one unit and its neighbours.

United Steel Companies, Ltd. (D. 1132)
This stand is devoted to a display of articles made in "Silver Fox" steels, including cooking utensils and tableware.

Waite & Son, Ltd. (F. 1345)
Lampshades in all materials and table standards in wood, chromium, pottery and glass, will be shown, as well as floor standards, ceiling fittings and billiards shades.

Walker Fender Co., Ltd. (Earls Court, 157)
In addition to the usual range of metal floor and table standards there will be new pendant and ceiling fittings and a floor standard with an ash-tray and table (illus.), the table being made of "Fostaboard" bakelite material.

T. Webb & Sons (A. 816)
Glass table lamps are a speciality. Dull satin lamps (illus.) with bright polished cutting in relief, which have been specially designed, will be among others to be shown for the first time.

Lewis Woolf, Ltd. (A. 714)
Among the mouldings to be exhibited are thumb rests for electric irons, cable end covers, bushes, lamp caps, push button and switch bar pushes. A new idea is an attractive moulded cover for electric lighting flexibles (illus.).

French Domestic Apparatus Exhibition

VISITORS to this year's Salon des Arts Menagers in Paris have found rather less novelty in electrical apparatus than previously. There has been a great deal more standardisation by the various manufacturers along certain lines, notably in cooking equipment.

Almost all electrical manufacturers are showing a small-sized range comprising three hot-plates above an oven. For these there is a greater variety of colour than in the past.

A waffle iron, the first perfected one to be made in France by a French firm, is presented by Bernard Huet. This consists of aluminium moulds with the two halves hinged together, on to which the element containers are fastened by milled nuts. The moulds can thus be changed for various kinds of waffles.

Electric refrigerators and washing machines are practically unchanged. Neither has so far proved sufficiently popular in France to justify much effort by French firms, and importers have preferred to stress their standard models.

As to electric vacuum cleaners, the models are now universally provided with a blower and nearly all the manufacturers have added a device for spraying liquid wax or disinfectants. Large-sized models are again in favour.

Electric heating appliances show a distinct tendency to the convection type. Lemercier has one consisting of elements enclosed in a case which is open at the bottom and pierced with slits at the top. A thermostat, with control on the top of the case but placed under the elements and protected against their radiation by insulating material, permits control of the temperature in the room.

On the whole, the situation in the appliance section seems to be due to the rapidly rising costs which have caused manufacturers to hesitate before producing anything really new. Prices of appliances have risen by 50 to 75 per cent. so that buying has been somewhat discouraged, and for this reason makers have preferred to rely upon their existing models rather than risk putting out novelties the demand for which might not justify the expense involved.

Permeability and Wire Diameter

Investigations into the influence of diameter on the magnetic quality of iron wires are discussed by Dr. T. F. Wall, of Sheffield University, in a communication to *Nature*. Magnetisation curves for Armco iron wires having diameters of $\frac{1}{64}$, $\frac{1}{32}$ and $\frac{1}{16}$ in., were obtained after these had been heated to 1,200 deg. C. in a stream of hydrogen until permeability had reached a maximum value. The author draws these inferences from the tests: (1) That there is one diameter giving the highest value of permeability, which falls rapidly as the diameter is varied from the critical value. The critical diameter for Armco wire is about 1/50 in., when the permeability is about 15,000; with diameters of 1/100 and $\frac{1}{8}$ in. permeability becomes 12,000 and 4,000. (2) That there is a surface layer that is magnetically harder than the core and this layer has a dominant influence on the magnetic quality of wires of small diameter. (3) By coating the wire with suitable material and afterwards heat treating, the magnetic quality may be controlled over a wide range. A critical diameter for maximum permeability exists for nickel wire also.

The Institution Dinner

Transport Minister on the Bill

MORE than eleven hundred people assembled at Grosvenor House, Park Lane, W., on February 10th, when the President, Sir George Lee, took the chair at the annual dinner of the Institution of Electrical Engineers. In spite of the record attendance the atmospheric conditions of the old skating rink were very noticeably better than they were at the last function of this kind. The improvement gave evidence of the satisfactory working of the air-conditioning plant installed in the meantime and of the obvious value of the system in providing comfortable conditions in public halls generally.

The speeches were of a good after-dinner type, well seasoned with wit, following the standard set by Dr. E. L. Burgin (Minister of Transport) at the outset when he proposed the toast of "The Institution of Electrical Engineers." If any of those present expected Dr. Burgin to give hints of what his Distribution Bill had in store for them they were disappointed. The Minister limited his mention of the subject to an expression of appreciation of the skilled help given him by electrical engineers in his work of framing a measure for distribution that would embody practical and technical improvements, and to a disclosure that the interests of the consuming public would come first—a generalisation which all will agree to be sound. His reticence was accepted by the President as the correct attitude because, as Sir George pointed out in responding to the toast, Parliament must be allowed to hear the Bill read before its provisions are divulged to others.

Distinguished guests on these occasions often give us interesting particulars about the Institution of which all its members are not aware. Thus Dr. Burgin referred to the year of its foundation, 1871, as ten years before the first electric train and eleven before the first tram, expressing the hope that tramcars would soon give place to trolley-buses. He told us, too, that 162 members fell in the Great War. Of the 230 million tons of coal raised in Great Britain, he said, 50 million was exported, 45 million was burned in domestic grates and 15 million (more than that used on the four chief railways) was consumed in electric generating stations.

Dr. Burgin concluded his remarks with an appreciation of the work done by Sir George Lee in advancing international radio transmission. The Rugby station and broadcasting generally might, he thought, become the greatest potential instrument of peace.

The President followed with some gleanings from unpublished records of the I.E.E., such as that in 1880 the Society of Telegraph Engineers, as it then was, first presented a petition to the Postmaster-General for a charter of incorporation, which was not granted until 1921, and in 1883 held its first conversazione at South Kensington with electrical exhibits. He regarded developments now taking place in the electrical industry as being due to research.

In proposing the toast of "The Guests," Dr. A. P. M. Fleming gave examples of the wide diversity of professional interests covered by the term "electrical engineer," ranging from architecture to accountancy. In bridging the gap between science, which crowded upon us almost too rapidly, the I.E.E. was strengthened by the co-operation of the Institutions of Civil and Mechanical Engineers. Among the guests he welcomed Sir William Bragg (President of the Royal Society), Sir Cyril Hurcomb (chairman, Electricity Commission), Sir Archibald Page (chairman, C.E.B.), Mr. C. Malegarie (France), Mr. G. J. Th. Bakker (Holland) and representatives of chemistry, gas, mining, metallurgy and shipbuilding, the chairmen and secretaries of local Centres and of students' sections, and the members of the Press. No country, he said, was better served by its technical journals.

At the I.E.E. dinner (left to right): 1, Messrs. L. C. Grant, W. G. Bass, C. E. Stewart and J. Hacking. 2. Dr. E. L. Burgin and Mr. R. Nelson. 3. Mr. A. Berkeley, Dr. A. P. M. Fleming, Mr. E. Grove, Major S. M. Mohr and Mr. J. Stinton Jones. 4. Messrs. H. M. Mathews, Ratcliffe Wright, and N. H. Miller. 5. Messrs. P. Good and O. M. Robson, Sir Robert H. Pickard and (extreme right) Mr. C. W. Bridgen. 6. Messrs. A. J. Ward, W. D. Madden and F. C. Sellens. *[Elec. Rev. photos.*

With regard to improvements in the efficiency of generation, he said that the work of the manufacturers in backing up supply engineers should not be overlooked. Finally he referred to the need for an incoming flow of well-trained young engineers who would become the corporate members of the I.E.E. in the future.

Response was made by Mr. A. Beverley Baxter, M.P., who in the course of his remarks quoted Tacitus as stating that the lust for power was the deepest passion in men. The work of those present, he said, might prove to be the deciding factor in a struggle for supremacy.

The banquet was followed by the customary reunion, which on these occasions is so much more than a mere name for a fortuitous gathering of people.

On the following evening (Friday) was held the Electrical Engineers' Ball at the same place. The surplus from this function goes to supplement the contributions of the 5,200 subscribers (out of 17,349 members) to the Institution's Benevolent Fund. In addition, it formed an opportunity, as it always does, of having a thoroughly enjoyable evening.

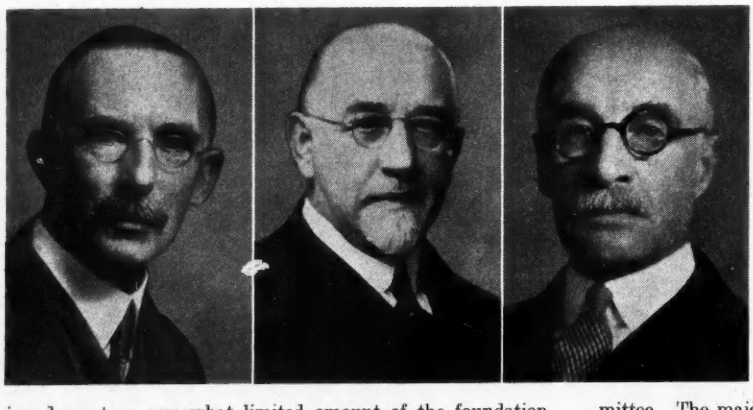
Research and Co-operation

Dr. Paterson on shortcomings in the electrical industry

THE customary luncheon on the occasion of the annual general meeting of the British Electrical and Allied Industries Research Association took place as usual at the Savoy Hotel on February 11th. The Association's annual report was reviewed in our issue of February 4th (p. 159).

The new president, Dr. C. C. Paterson, presided, and following the loyal toast, that of "The E.R.A." was proposed by Dr. E. L. Burgin, Minister of Transport. He said the Government placed high value on the scientific associations which guided and helped industry in its development, and appreciated the value of having at the helm the trained scientific mind.

Responding, Mr. C. C. Paterson remarked that, if what he was about to say might seem indiscreet, he was at least sincere. He was not inspired by any sectional interest; his remarks were the result of his own personal observation and outlook. Every association had two values, for what it achieved and for the kind of influence it exerted. The E.R.A. might be mainly of value on account of what it stood for. It represented one of the real and one of the rare influences which were holding together an industry which seemed to be splitting in half from the top downwards. The split was a diagonal one. One half had nearly all the foundations and a tapering superstructure and employed about three-quarters of the total personnel. The other had a fine superstructure tapering down to a somewhat limited amount of the foundation.



From left to right: Dr. C. C. Paterson, president of the E.R.A.; Mr. A. E. Tanner, the new chairman of the Council; and Mr. A. Berkeley (*Elliott and Fry*), **the retiring chairman**

The focus point of the whole electrical industry was the service it gave to the public. It was by the assistance it gave to the industry to achieve this service that the E.R.A. and other organisations must be appraised. That was what the industry existed for. This service to the public was given not in terms of energy supplied, but in terms of the plant and appliances which converted the energy into useful purposes in factory and home.

Unless the style of all of those appliances and plant, their quality and price and arrangements for operation were best suited to their customers—unless their progres in devising new or improved applications and their plans for commending their appliances to the public were the result of informed study—unless these things were made the principal objective of a united industry, were they not making the means more important than the end? Were they not putting the effort they expended on factory processes, power distribution and generation and their profits in a more important place than the object for which they all existed? That object, *i.e.*, the service in the broadest sense which the public had from the plant and appliances it used, should be the object of the whole structure of the industry.

Manufacturers had to prosecute research to perfect and cheapen their processes, and undertakers had to do the same to ensure reliability and cheapness of their supply. These were sectional activities and legitimately the individual business of supply authorities and manufacturers. But the things the public used and the conditions of using them were surely the vital part of service. "What *concerted* care did the industry as a whole give to them and their use?"

The things which the public used were of necessity being made by the manufacturer merely to fit in with existing conditions of electricity supply and sale. When they were ready for the market he, in the majority of cases, handed them over to the user through an intermediary in the form of a contractor or a distribution or supply authority. Experience in the hands of the public was thus only being learned by the manufacturer at second hand.

With a view to keeping down the price and to stimulating enterprise in introducing more attractive products for the user, manufacturers (perhaps wisely) were put into an arena to fight one another before an audience of varying degrees of sympathy. The electricity undertakers, who formed the larger part of this audience, sometimes in their turn found themselves called to account for the faithfulness of the stewardship of the monopoly which they administered. And the criticism of both was in terms of the effectiveness of the service they gave to the public.

Both halves of the industry were therefore on their trial before the public for the effectiveness of the service which they gave, through the medium of the same appliances. But the products and appliances themselves and the policy for making their adoption successful in the hands of the user were the result of very little joint work and preliminary joint study. Was their organisation such as to secure automatically that progressiveness which would prevail if manufacture, supply and marketing (both of electricity and of appliances) were handled in a fully co-operative spirit? If not, the enormous research and development resources of the industry were working always with narrow and uncertain objectives. This was not a sensible or economical way to exploit such resources.

It might be an attractive feeling to have powers which enabled one to dominate one's partners, and there might be a great temptation to use those powers. But such a psychology would never maintain in the industry that structure of informed scientific and critical study on which its development ultimately depended. So it was vital to counter any such tendency, and to overcome the admitted difficulties of real partnership. That was why, said Dr. Paterson, he valued the E.R.A. on account of that for which it stood. It was a real partnership of the whole industry for the study of general research problems. It knitted in, almost automatically, with the B.S.I. or with the Wiring Regulations Committee. The majority of the resources in brains and effort for planning new plant and appliances for the use of electricity were inevitably and rightly, though not entirely, on the manufacturing side. These research and development resources were the technical foundation of the service that they gave as an industry to the user; and that was why Dr. Paterson urged that it was a foundation as important to the undertaker as to the manufacturer. If this technical and scientific foundation were allowed to weaken he could not see how the industry could remain progressive.

But was it not serious that the only formal partnership links in the structure of the industry seemed to be the three bodies above mentioned? The Electrical Development Association used to be the child of a partnership, but a divorce was arranged a few years ago, and the custody of the child went, Dr. Paterson presumed, to the least guilty party. It was to him impossible to contemplate this separation as a permanent condition. He suggested that the E.D.A. ought again to join the bodies which, like the Research Association, were healing, rather than accentuating, the cleavage of the industry.

The spirit of partnership could go further. Initially the formal responsibilities of the Electricity Commission, with its official Government cachet, were only in connection with electricity supply. But it was now tending to advise on matters which affected the whole industry, and yet the Commission had no link with the huge manufacturing forces of the electrical industry.

Whether in the form of the Commission or otherwise, some kind of Advisory Board which knew and could advise regarding the whole industry had already become of vital importance. The causes of some present anxieties would tend to disappear in the atmosphere of confidence engendered by the existence of an electrical cabinet.

Mr. A. Berkeley proposed the health of the president, to which Dr. Paterson briefly replied.

It was announced at the annual general meeting that Mr. Berkeley had retired from the chairmanship of the Council, in which he had acted for three years. He is succeeded by Mr. A. E. Tanner, chairman of the C.M.A.

Meetings and Discussions

Present-day practice in the rapid clearing of faults was dealt with at a meeting of the I.E.E. Transmission Section on Wednesday by Messrs. T. W. Ross and C. Ryder. This year's Faraday Lecture is by Dr. A. P. M. Fleming who is using films and lantern slides to illustrate his accounts of the outcome of Faraday's work. The burning questions of compulsory wiring rules and the registration of contractors and operatives are brought prominently to notice by a second paper by the A.S.E.E. Committee appointed to deal with these matters which was read this week. At a meeting of the N.E. Coast Institution of Engineers and Shipbuilders last Friday handling practice and welding in shipyards were introduced in a paper by Dr. J. Montgomerie.

Quick Fault Clearance

HIGH-SPEED protection as an aid to maintaining service following system short circuits is reviewed by Messrs. T. W. Ross and C. Ryder (Metropolitan-Vickers Electrical Co., Ltd.) in a paper read before the Transmission Section of the INSTITUTION OF ELECTRICAL ENGINEERS in London on February 16th.

The authors explain how rapid disconnection of a faulty section minimises the development of angular displacement between synchronous machines in interconnected systems. Field-forcing excitation is not a complete remedy, since during certain short circuits synchronous tie lines become ineffective and system instability may still arise. Stability is not endangered provided the angular displacement does not exceed 100 electrical degrees. To ensure this the allowable time delay in fault clearance in the most severe short-circuit case (*i.e.*, involving all three phases and close to the generator) is of the order of 0.25 second, or less if the impedance of the synchronous tie is considerably increased as the result of disconnecting the faulty section.

Beside quick fault clearance other precautions are necessary to avoid loss of load, but they are very seldom taken and most gear in use causes unnecessary disconnection of healthy machines. Certain classes of machines recover more readily than others, but require a considerable increase of current. To give them a chance of remaining in service over-current protective devices should be designed to allow for the increase mentioned, while it is highly desirable that all under-voltage releases, if such be considered necessary, should have a delayed action. It is also an advantage for reverse-current trips on rotating convertors to have delayed action, but care is needed to make it bear some relation to the reverse current.

A very common practice is to provide time-delay over-current relays as back-up to the quick-acting unit-type protection. Such a practice may, however, lead to complications, since these relays can operate on the heavy synchronising currents which flow between synchronous machines following a system fault. The tie between the machines is thus broken, and this prevents them regaining a state of stable equilibrium when otherwise they might do so. If back-up protection is installed this should preferably be of the time/distance measuring type with a setting to cover at least two sections of network. Failing this, the over-current relays should have a time delay sufficient to cover the oscillating period, plus the fault-clearing period.

Circuit-breakers are now available which can clear a short circuit in 0.06 second, but such speedy operation is not always necessary. Conventional breakers can be modified to give tripping times of 0.12 to 0.16 second, and relays with operating times of less than 0.02 second have been developed.

Prevention of Unnecessary Tripping

But attempts to speed up relay operation must avoid unwanted tripping. The preventive means employed by the authors are described in the paper. They state that the most satisfactory method of ensuring that high-speed differential (balance) protective gear will remain stable during through-fault transient conditions is to incorporate an electrical bias, which increases with the through-fault current.

Various "Translay" and beam-type relay schemes with pilot wires are illustrated; in some of them summation current transformers are utilised to: (*a*) reduce the number of relays; (*b*) provide a bias current from any or all phases; and (*c*) increase the winding space available on the relay electromagnets. Such arrangements are, usually, not possible when power transformers are included in the protected zone, and it is then preferable to have one relay per phase in order to obtain secondary current balance during through faults.

With the lock-in system the circuit-breakers at one end of the protected zone are prevented from tripping on through faults by a locking signal controlled by directional relays at the other end of the zone, or in the zone immediately beyond it. The signals may be initiated in various ways and are conveyed by pilot wire or telephone circuit. An important feature of this system is that operation is sequential and does not depend on the speed of individual relays for discriminating purposes.

An alternative signal channel is obtainable by carrier-current relaying, which is in successful use in America and is rapidly taking the place of other methods when pilot circuits are not available. It is quicker than d.c. locking, and to reduce the cost of terminal apparatus frequencies of the order of 100 kc are used for transmitting the signals.

Thermionic valves generate the h.f. and render the received signals suitable for actuating electro-mechanical relays. The h.f. is fed into the lines through static capacities and rejector choke coils (line traps) confine the signal currents to their particular section. The carrier frequencies differ for adjacent sections, reverting to the original on the third consecutive section.

When pilot wires or carrier currents cannot be employed it is usually possible to use some form of distance relaying and thus obtain high-speed tripping for faults over part of the feeder length. For distance measurement based on the impedance principle, six elements are needed for each phase. Three are connected to measure the impedance under phase-fault conditions and the other three under earth-fault conditions. One element of each set is adjusted to operate for faults over the first 75 per cent. of the feeder length; the second element is set for a distance up to 50 per cent. into the next section; while the third (back-up) element covers a distance up to 25 per cent. into the third section.

The chief objection to this method is the unavoidable delay in the second zone, which may be of the order of 0.5 second. This may be obviated by substituting the carrier-current locking principle for the time discrimination used in this zone.

The Faraday Lecture

THE annual Faraday Lecture of the INSTITUTION OF ELECTRICAL ENGINEERS, which was delivered at Liverpool on February 14th and is being repeated at several provincial centres as well as in London (in May) by Dr. A. P. M. Fleming (Metropolitan-Vickers Electrical Co., Ltd.) this year outlines the evolution of electrical power from its magnetic origin.

It commences with the presentation of a short cinema film showing the discoveries of Gilbert, Galvani, Volta, Oersted and Sturgeon. Next the classical experiments of Faraday, upon which all subsequent electrical plant has been based, are depicted in a second film.

Dr. A. P. M. Fleming, C.B.E.

Faraday's first generator consisted of a copper disc rotating between the poles of a permanent magnet, but was soon replaced by coils of copper wire; and the lecturer employs lantern slides to illustrate the varied means of mounting the coils and of providing the necessary magnetic field. He draws attention to the continuous increase of generated voltage, speed and size of single machines; the change-over from d.c. to a.c.; and the influences exerted by the introduction of the steam turbine and the development of transmission and distribution networks.

The British national grid system of interlinking power stations is outlined, and reference is made to a proposed scheme of electrical interconnection throughout Europe. Energy consumptions per head of the population in various countries are compared, and indication is given of the extent to which electrical power has already become a commodity of export from such countries as Switzerland and the United States where water power is plentiful.

The growth of component parts of power systems has compelled more effective use to be made of known materials, and

the development of new ones of superior properties, for the study of which new techniques have been evolved. These are illustrated by the lecturer with the aid of lantern slides and demonstrations, which emphasise the importance of the crystal structure of metals, the photo-elastic method of analysing stress distribution and the magnetic method of detecting minute cracks in metal parts.

Electric break-down phenomena in gaseous, liquid and solid insulating materials are demonstrated as are the motive power obtainable from thermo-electric, thermo-magnetic and photo-voltaic processes, while a cartoon film is used to illustrate the process of atomic distintegration and the associated energy changes.

The electromagnetic method is not the only way of converting natural sources of energy into electrical form. The lecturer illustrates three alternative means by the use of model electric motors; but because of the relatively low efficiency of conversion no important applications of these methods appear likely at present. In the same way, the extent to which such recent physical discoveries as controlled atomic disintegration will be utilised cannot yet be forecast.

Compulsory Wiring Rules

DURING last year a paper which set out "The Case for Compulsory Wiring Regulations and Registration" was read at ten meetings of the ASSOCIATION OF SUPERVISING ELECTRICAL ENGINEERS in various parts of the country. The authors (Messrs. S. B. Donkin, H. A. Crabtree, J. M. Crowdy, A. Kirk and J. Munro) have since examined reports of the ensuing discussions, as well as references to the subject in the technical Press. They have now prepared a second paper in which they have endeavoured to correlate the varied and numerous views expounded for and against the case stated in the original paper.

The second paper, which was read in London on February 15th, states that the provincial discussions were on the whole favourable to the need for compulsory methods. Throughout the series of nine provincial meetings only one vote was given against the resolutions which were passed requesting the A.S.E.E. to call a conference and appoint a committee for the preparation of a scheme for submission to the Ministry of Transport.

In reply to a questionnaire seeking their approval of (*a*) compulsory wiring regulations, (*b*) compulsory registration of electrical contractors and operatives, (*c*) compulsory approval of installation materials, accessories and apparatus, the Electrical Contractors' Association and the Electrical Trades Union expressed themselves as being in favour of all three items. The Incorporated Association of Electric Power Companies answered "No" to all three. The Incorporated Municipal Electrical Association favoured all the proposals, except in respect of operatives. The National Register of Electrical Installation Contractors was unable to express an opinion.

A Majority in Favour

The analysis of the arguments in favour of, and in opposition to, the original proposals indicates that, apart from a natural distaste for compulsion in any form, no reasoned objection appears to have been put forward. In view of the numerous complaints of inferior work, it is felt that there is need for stricter control. The majority of well-informed observers have expressed the opinion that the time is now opportune to proceed with the matter seriously and energetically, but hitherto there has not been sufficient co-operation in the industry.

Since bad "work" has not been defined, an approved set of rules embodying the minimum requirements is one of the most urgent necessities. If compulsory registration were enforced the risk of an operative losing his licence would act as a deterrent to the installation of dangerous wiring or material, which, in itself, would mitigate the need for inspecting every addition to, or extension of, existing installations. Responsibility for payment for rectifying installation work condemned by inspectors is a legal question and is not dealt with.

An outstandingly important point arising from the discussions is the financial loss caused by the interruption of production in factories run on modern lines due to failure of supply caused by badly wired installations, or due to inefficient maintenance by inexperienced and unqualified staffs.

It is felt that approval of materials would be attainable if the various associations "pulled together." The registration of operatives would greatly decrease the necessity for time spent on inspection and relieve the unfair competition of untrained interlopers. The E.T.U. is entirely in favour of the proposal.

The number of contractors at present on the National Register is 1,719, and the number whose applications have been declined or whose registrations for various reasons have been cancelled is 1,748, which includes some 330 due to bankruptcies, &c. But the majority of these non-registered contractors can still carry on installation work of a low grade without any legal restrictions. There is also the unfair competition of a large number of "curbstoners" who never do apply for registration. Registration of contractors alone (be it voluntary or compulsory) is much less effective than it would be with compulsory regulations and registration of operatives and approval of materials.

A further point has been raised, namely, that compulsory registration should be extended to include electrical power engineers and men holding responsible positions on the engineering side of electrical undertakings.

All parties seem to be agreed on one point, namely, that an approved and simplified set of regulations is required. Compulsion would not cope with irresponsible or intentionally dangerous actions, but they would be made less easy of accomplishment, and thus protect the public.

It has been agreed that a committee of wider representation should be constituted, comprising two representatives from each of seventeen organisations in the electrical industry, two Government Departments, and the Fire Offices Committee. Ten of the organisations have intimated their intention to appoint representatives. The Government Departments, although not able to be represented, are willing to give advice and help. Three replies are still outstanding, but arrangements are in hand for calling the first meeting of the new Industry Committee at an early date.

Shipbuilding Practice

FACTS relating to shipbuilding practice in various countries are presented in a paper by Dr. J. Montgomerie (chief ship surveyor, Lloyd's Register) which was read before the NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS at Newcastle-upon-Tyne on February 11th.

The author states that in Germany and Holland mechanical transport is highly developed and man-handling of material is practically unknown. In Germany powerful overhead cranes are installed, also large gantries, overhead ropeways and travelling tower cranes. In Holland travelling tower cranes are more popular at the berths. In Russia what little is known points to the adoption mainly of electric cranes and derricks. In one yard in Italy magnetic cranes of 5-tons lifting capacity are used for unloading the material from railway trucks in the shipyard.

The amount of pre-construction or assembly on the ground depends almost entirely on the available lifting appliances; for example, in America it is quite common to find lifts of 50 and 60 tons and in some cases even greater, and therefore a vast amount of material is prepared complete on the ground and lifted into place. This also applies to a lesser extent in Holland. In Denmark very little ground assembly is done. In Japan pre-construction is being greatly increased as an essential element in their plans for large-scale welding. In Germany and Spain concrete roads are provided for electric trucks to transport the smaller materials to the berths.

Shipyards abroad are equally divided on the merits of the controversy between the drilling and punching of plates. In Holland when more than two plates have to be marked from the same marking off they are drilled and portable electric drills are employed on board. In Italy drilling is gradually displacing punching for nearly all plate and much sectional material. It is said to result in improved workmanship and 20 per cent. reduced cost. In Japan electric radial drilling machines are coming ino favour and portable drills used on board are usually electric.

Welding Practice

The use of electric welding has proceeded slowly, and cautiously. Germany has been the protagonist of bare-wire welding, but there is now a tendency to use cored or covered electrodes, thereby bringing German practice into line with that of the rest of the world. A point of interest arises in respect of the coated electrodes manufactured in Germany. It seems to be the practice in other countries to reverse the polarity as between coated rods and uncoated rods; that is, coated rods are attached to the positive pole and uncoated rods to the negative pole. In Germany coated rods are attached to the negative pole, the reason given being that the men are used to attaching the electrode to this pole when using uncoated electrodes. For the same reason, the majority of the plant in the shipyards is d.c., the single-operator set being the most common. Although 5 mm. and 6 mm. rods are being used for down-hand work in the welding shops, the usual sizes used in the shipyards are 3¼ mm. and 4 mm. No regular use has been made of electrodes larger than 6 mm.

In Germany large covered welding shops are to be found with lifting appliances up to 20 tons or more, and the general trend is towards the pre-construction of as large units as possible on the ground. American shipyards had large lifts before welding was thought of and they are now finding these con-

venient for an expansion of electric welding which, in extent, is not paralleled in any other country. Welding in America has made great strides and, despite certain State and Federal regulations, is being increasingly used in heavy structural work, in the manufacture of all kinds of metal containers and in shipbuilding. Automatic metallic arc and automatic carbon arc welding are both being used in the United States of America for important structural parts of ships and speeds of 12 to 18 inches per minute are possible. Tilting tables to allow of a vertical position of the electrode are frequently used and particular attention is given to the protection of the workers.

Training of welders generally proceeds on similar lines everywhere and the detailed methods in use in Great Britain are a fair indication of those adopted by other countries. There is a marked difference, however, in the number receiving this training. In one works in America, for example, 240 students are taught every 24 hours, the fees being paid by themselves, and the waiting list extends some two or three months into the future. Trained welders receive a classification society certificate or a certificate from the State or Federal authority, but builders assume the responsibility of satisfying themselves as to the efficiency of the men they employ.

Testing Protective Gear.—There was a large attendance at a recent informal meeting of the INSTITUTION OF ELECTRICAL ENGINEERS in London, when Mr. G. H. Fowler opened a discussion on "The Routine Testing of Protective Gear," and the discussion was well maintained. Mr. Fowler outlined the procedure for ascertaining that devices were effective and that the human element entrusted with inspection and conditioning was completely reliable. Routine instruction should be furnished in writing and a precise record kept in log books of all inspections and action taken. He also emphasised the importance of determining in advance the course of action to be taken if inspection revealed defects, and several agreed that ready telephone communication with headquarters was essential for the testing engineer.

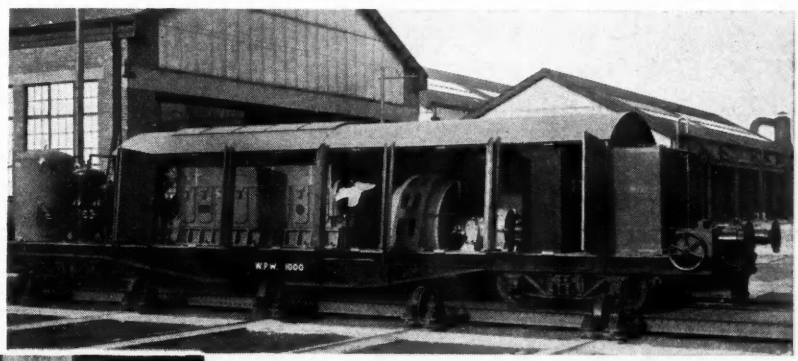
Refrigeration and Air Conditioning.—At a recent meeting of the PAISLEY ASSOCIATION OF ELECTRICAL ENGINEERS Mr. W. I. Aitchison (Paisley Electricity Department) lectured on the subject of refrigeration. He mentioned factors that governed the choice of refrigerants and outlined the general design of domestic and commercial equipment, contending that in this country only about twenty-five days in a year were naturally suitable for storing food under ordinary pantry conditions. The lecturer also spoke of the benefits to be derived from the air-conditioning of places of entertainment, blocks of offices, and individual homes.

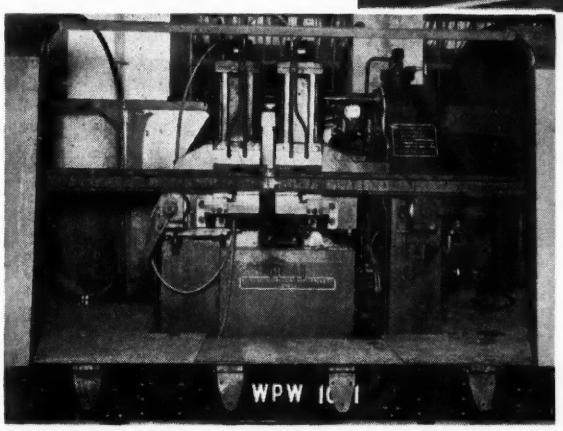
Welding Rails for London Transport

WE recently witnessed a demonstration of rail welding, part of the tube silencing scheme, at the Lillie Bridge Works of the London Passenger Transport Board.

The contract for the mobile welding plant was executed to the requirements of the Board by the A-I Electric Welding Appliances Co. The plant comprises a 300-kVA automatic flash welder, arranged with pneumatically operated clamps and upsetting mechanism. It is designed for the automatic welding of running rails up to 12 sq. in. sectional area, and conductor rails up to 15 sq. in. in area. A feature of particular interest is that tests have shown that rails of 0.7 per cent. carbon content, others 0.6 per cent. chrome and rails which have been sorbitically treated can be welded satisfactorily. The manufacturers have incorporated in the design of the machine new patented features particularly suitable to rail welding.

With the welder is supplied an electric post-heater for the normalising of the joint. The heater clamps are arranged for pneumatic operation and automatic regulation of the temperature is effected by optical pyrometer control (manufactured by the Radiovisor Parent Co., Ltd.). The heating machine is mounted on wheels and can be brought into the required post-heating position at will.





Railway welding plant for London Transport; (above) the mobile generating set, and (left) the rails in position for welding

For the supply of a.c. to the welder and post-heater there are a 400-b.h.p. Diesel engine and 300-kVA alternator, manufactured by the English Electric Co. Two special well wagons, designed and manufactured by the L.P.T.B., are used to accommodate the plant. The automatic flash welder, with self-contained motor-driven air compressor unit, is mounted on the one wagon and on the other are the Diesel engine, alternator, control panels and air compressor unit for the operation of the post-heater and grinding and chipping auxiliary tools. Both air compressor units were manufactured by Broom & Wade, Ltd.

The standard 60 ft. lengths of rail are lifted on to a temporary conveyor from which they are fed to the welding plant. The rails to be welded are placed in the jaws of the machine, aligned and then clamped by heavy pressure exerted by the pneumatically operated clamp mechanism. The welding operation is then begun by push-button and from this point no further attention is required by the operator until the weld is automatically completed, when the clamp jaws are released and the rail carried by the conveyor to the post heating operation. The complete welding operation comprises preheating, flashing, and upsetting, the whole cycle of operations being controlled by depressing a push-button.

Preheating is done by a reciprocating movement of the right hand welding head of the machine, which is mounted on slide bars and carries one length of rail securely clamped in position. This reciprocating movement controls the welding current flow, heat being given to the rail end, partly by conduction from an arc and also by the heat generated by the resistance of the steel to the passage of the heavy electric current. The reciprocating action is maintained for approximately two minutes until the physical condition of the metal at the extremity is so altered as to permit the automatic change over to flash welding, which is then maintained for a period of about ten seconds. At this period a temperature of 3,500 deg. C. is reached and the maximum current is 45,000 A. The current is then automatically cut out and a heavy forging pressure of 27 tons is applied to the weld, which consolidates the joint. The complete welding operation is carried out in less than three minutes.

On the completion of the welding operation the conveyor carries the rail to the chipping plant, where the weld extrusion is removed, and then on to the electric post heater. The welded rail is placed in the jaws of the heater and securely clamped by pneumatically operated mechanism. When the required temperature of 850 deg. C. is reached the heating current is automatically cut out, thereby ensuring that all joints receive the same post-heating treatment.

Test figures obtained on loads far in excess of running conditions have indicated that on normal loading conditions the strength of the joint is up to the standard of unwelded rails. By the method described continuous lengths of running rails up to 300 ft. and conductor rails up to 240 ft. can be made for use in tube tunnels. For use on the open track it is proposed to have running rails made up in lengths of 240 ft. and conductor rails in lengths of 120 ft.

The plant is the first of its type to be constructed in this country.

Correspondence

Contributions from readers are welcomed. The writer should give his name and address, not necessarily for publication

Applying for an Appointment

I most heartily congratulate the author of the article with the above title in the current issue of the ELECTRICAL REVIEW. I entirely agree with every point he has raised, with the exception of his final word as to advertising under box numbers.

I quite agree that candidates are shy of replying to box numbers for many reasons; for instance, it has been known for a candidate actually to apply for his own job. Further, any position which may be vacant with a municipal authority, or a company of repute, should not require the camouflage of a box number, and the method is open to severe criticism, as the best offer may or may not be open to the best man, one having already been earmarked for the position. I am unable to find any just cause for any employer advertising under a box number. An applicant has to put his cards honestly on the table, and the employer or advertiser should do the same.

The author suggests that there are occasions when employers resort to the method of box numbers for their own protection, but surely that is a sign of weakness and can easily be overcome by carrying out strictly to the letter the much-abused, but straightforward stipulation that "canvassing will be a disqualification." O. G. COOK.

Bingley, Yorks, *Feb. 11th. Chief Engineer and Manager.*

I would like to express my appreciation of the excellent article by "A Chief Engineer" in your issue of February 11th and also make some comment from the applicant's point of view.

1. Concerning good handwriting. It would help applicants no end if prospective employers would type their name after their signature. Employers get very annoyed when called by different names, and it is generally their own fault.

2. Some employers do not treat applications with the privacy they deserve. A large number of applicants can show evidence of their applications having been discussed, or casually mentioned to people who are of no importance in the case. This does a great deal of damage to a man's chances. Some employers are personal friends of an applicant's present employers and the result is generally fatal to the applicant. Testimonials given over the 'phone can be very misleading, especially if the applicant is a valuable employé and his employer does not want to lose him.

3. Some employers interview anything between 30 and 50 applicants for one appointment. How many employers give their men half a day off to attend an interview? Most people who attend interviews have to make some untruthful excuse which cannot be repeated very often. Thus, unnecessary interviews jeopardise a man's chances of ever obtaining a better position and so employers should limit to a bare minimum the number of interviews.

4. Employers should when advertising state their name, the limits of salary they are willing to pay and particulars of the job. With regard to the last point, I have on many occasions only found out the nature of the work at the interview, this has often been quite inferior to the impression given by the advertisement.

An employer who is unwilling to state his name and the salary offered can hardly expect confidence from the applicant; it gives the impression that he is merely out to get the cheapest man. If an employer is after a good man the only way one can decide whether he can trust an "unknown quantity" with his private business is by the nature of the advertisement. A REGULAR APPLICANT.

February 12th.

Railways and Speed

Regarding Professor F. J. Teago's article in your issue of January 28th, I do not think that the main railway lines in this country suffer really seriously from road competition. When they do suffer it is due to the ends of the journey which may be referred to as feeder systems. As Dr. Teago points out, it is these feeder systems which are, to a large degree, the cause of most of the trouble. I should like to point out, however, that the question of raising the schedule speed of the feeder systems from the passenger's point of view is not only an engineering matter, but also a question of providing more trains at much more frequent intervals, so that waiting time is cut down. If this were done a great improvement would result without increasing the actual average speeds which, of course, is also desirable. The question of how this is to be done is financial. Where the feeder is a heavily loaded suburban line then, of course, electrification is the solution; when it is represented by a side line it may be met possibly by the Diesel-electric.

The column "Installed h.p." in Table I wants considerable explanation. The installed h.p. for the electric vehicles is, as far as I can see, based on the hourly rating, whereas the continuous rating should be stated as this can be equated within reason to the r.m.s. current. The equivalent of the continuous rating in the case of a steam locomotive is difficult to determine, but probably it would be best to take the average h.p. output during the service period of the locomotive. I do not think that the figures under installed h.p. for steam would meet the above definition and I would suggest that the figures given are not really sufficiently scientific to give a true comparison.

The motor coaches mentioned in the table naturally owe a good deal of their weight to passenger-carrying facilities, and, therefore, it is hardly desirable to have a column of h.p. per ton without some comparison between those vehicles which are passenger carrying and those which are not.

Dr. Teago quotes the fundamental fact that tractive effort is the product of adhesive weight and co-efficiency of adhesion, yet he also states that with the "Metadyne" system of control the present value of the maximum tractive effort will be substantially increased. On any straight electric equipment, however, the maximum tractive effort is limited by the adhesion and though the "Metadyne" may have many advantages it cannot actually increase the maximum tractive effort.

The author states that so far as the secondary lines in this country are concerned, electrification and the use of motor coach stock would appear to offer an easy solution. I quite agree, but it should be pointed out that these secondary lines must under no circumstances include side lines. The traffic density on the side lines is not sufficient for electrification.

The question of track and track maintenance is not only a question of dead weight per axle, or the torque exercised by the axle, but is directly associated with the correct design of the truck. This point is referred to by Dr. Teago, but I think it should also be mentioned that the point has been appreciated most fully by railway engineers over the greatest number of years, and yet it is also rather disappointing that the scientific and mathematical development of trucks and their springing progresses extremely slowly. E. H. CROFT.

Birmingham, *February 11th.*

Oxford's Intentions

In the current issue of the ELECTRICAL REVIEW, page 211, you publish a note about Oxford, and it may be that the last paragraph of this note will create an erroneous impression.

It is not the intention of the Oxford Corporation to communicate direct with other municipalities owning electricity undertakings, but with the appropriate Associations—the Incorporated Municipal Electrical Association and the Association of Municipal Corporations.

H. G. FRASER,
City Electrical Engineer and Manager.

Oxford, *February 12th.*

Overhead Lines and Public Safety

At various times during the past ten years I have discussed the following question with several electrical engineers of high standing but have not, so far, obtained a reasonable reply. The question is: Why may a tramway trolley wire at 550 V to earth be erected over a busy street without any protection to the public in the event of breakage, while in a remote village an overhead supply line with a maximum of 250 V to earth needs all sorts of devices 'to secure the safety of the public'?

The low-voltage supply line must be arranged in vertical formation with the bottom conductor at earth potential, *or* the "live" conductors must be insulated, *or* some form of guard, designed to earth a falling conductor before it reaches the ground, must be adopted. Most trolley wire, so far as I am aware, is solid hard-drawn conductor which is more or less rigidly secured to the trolley ears and fittings and is subject to the hammering of collectors especially at frogs and crossings. On the other hand l.v. overhead network conductors are generally hard-drawn stranded cables attached to the insulators by flexible binders.

So far as crystallisation of the conductor and consequent breakage is concerned it seems to me that the unprotected trolley wire is working under much more dangerous conditions than the highly protected l.v. supply line. I fail to see how the arrangement of a l.v. line in vertical formation with bottom wire at earth potential can be relied on to prevent a broken

hanging wire from remaining alive. On a perfectly calm day the broken conductor should make a short circuit with one or more of the wires below and blow the fuses, but it is just as likely that the fuse feeding the broken wire will blow and leave the others intact. Much depends on the loading of the separate phases before the fault occurs. It is therefore quite possible to have a hanging broken wire made alive from the other phase wire with which it is in contact.

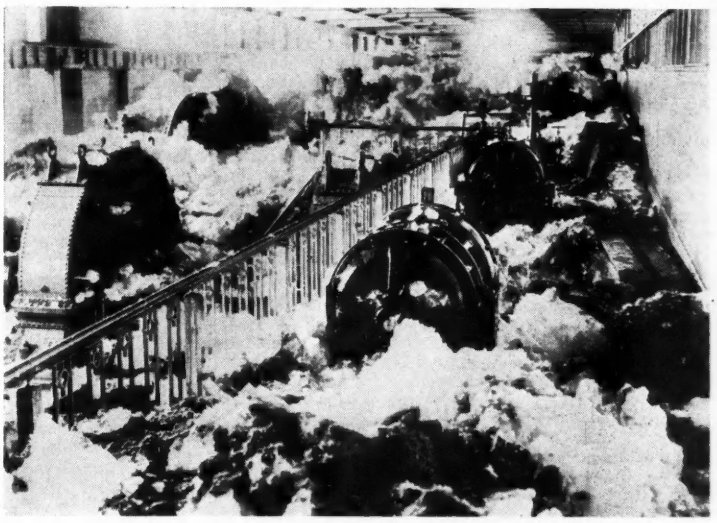
Has there been some loose thinking in framing the Overhead Line Regulations, or are there some reasons for this apparent lack of logic? Perhaps some of your readers can enlighten me. A. B. J.

February 9th.

Boiling-plate Characteristics

The article by Mr. W. B. Parker in your issue of February 11th constitutes a valuable contribution to the work which has been done on this important problem.

There are, however, one or two points which seem to call for further explanation. In particular, it is difficult to understand the reasons for Mr. Parker's selection of two utensils from the three types he classifies for each hot-plate tested. For example, while the " Chromalox " and tubular-sheathed plates are both termed semi-radiant, the former is tested with special and ordinary aluminium pans and the latter with enamel and ordinary aluminium pans. Would it not have been a fairer test to have taken each plate with all three types of utensil?



The avalanche that recently wrecked the View Falls Bridge, Niagara, also caused extensive damage to the Horseshoe Falls plant of the Hydro-Electric Power Commission of Ontario

The suggestion concerning the incorporation of a thermostat in a solid plate is interesting, and there seems to be no reason why this could not be applied in practice, although it is doubtful whether the increased cost would be justified.

Mr. Parker's evident desire to be fair to each type of plate somewhat weakens his final championship of the non-solid type of plate. Indeed, until the concluding paragraph, one gets rather the impression that the author is going to decide for the solid plate and special utensils.

It would also be interesting to know why Mr. Parker distinguishes between commercial and domestic cooking in deciding the best type of hot-plate. J. B.

February 12th.

The author of the above article seems to have carried out considerable investigation, and I should like to ask if he has any information concerning current leakage from hot-plates.

By the simple process of placing a milliammeter in series with the earth wire, I have made some observations on modern cookers, and find that this leakage may be considerable, the main contributors being the hot-plates. I have measured up to 32 mA on one type of cooker, and upon referring to the makers I was informed that other cookers were worse.

It is difficult to obtain reliable figures. In fact, leakages appear to take place whether the plate is hot or cold; the highest readings have been recorded when the plate has been run up to full heat without any utensil being placed upon it. On one occasion the cooker mentioned above showed nearly 40 mA, but it was ascertained that the mains voltage was about 3 per cent. above normal for the district.

I am not advancing any opinion as to whether such leakages are likely to be dangerous or otherwise, but am anxious to obtain some information on the matter in order to confirm my own observations. It is, perhaps, rather significant that the B.S.S. mentioned by your contributor contains no reference to any minimum insulation resistance for hot-plates.

Folkestone, *February 12th.* T. C. GILBERT.

Refusal to Connect

With reference to the letter in the current issue of your journal from Mr. C. J. Gummerson of Leeds, I would advise you that the undertaking concerned is Morley Corporation Electricity Department, and the reason why I withheld connection from this particular installation is as follows:—

It is quite correct to state that each motor was controlled by a fused main switch, but this actually comprised the starter and main switch called for in the Regulations, and therefore the wiring was not protected other than by the main switch-fuse. I recommended that a circuit should be run from the main switch-fuse to a distribution board suitably located, from which the various circuits to the motors could be fed. I do not see anything extraordinary in this stipulation.

N. HUNTER, A.M.I.E.E.,
Morley, *February 11th.* *Engineer and Manager.*

N.J.I.C. and N.J.B. Records

I am frequently asked by new members of the National Joint Industrial Council and National Joint Board of Employers and Staff Members—Electricity Supply Industry, if it is possible to supply copies of the minutes of the Council and Board for their earlier years, say from 1919 to 1926. These minutes have long been out of print and I think it possible that there may be some copies on old files belonging to past members who have no further use for them.

If this should be so and any reader would be good enough to forward copies to me I should be grateful.

1, Dickinson Street West, A. H. BANKS,
Manchester, 2, *February 9th.* *Employers' Officer,*
National Joint Council and National Joint Board.

New Books

Fundamentals of Radio. By F. E. TERMAN. Pp. 458; figs. 278. McGraw-Hill Publishing Co. Price 21s.

The second edition of Prof. Terman's " Radio Engineering " was reviewed in the ELECTRICAL REVIEW of October 15th last, and this present volume is, to a large extent, an abridged version of the former work. The subject, however, is treated in a simpler manner, and is confined to fundamental principles. The book is destined essentially for instructional purposes, and the author has had collaboration from instructors at American naval and military academies. A large number of problems is given at the end of chapters, and these problems are suitable for class-room work, being of the type that can be dealt with overnight. The text assumes an elementary knowledge of mathematics and a.c. circuits.

This book is a comprehensive textbook on radio communication, with a leaning towards the principles of broadcast working. The historical aspect is omitted, so that up-to-date circuits only are considered. The first three chapters are of an introductory nature on radio circuits; the next seven, which form about half the book, deal with the various applications of valves to radio communication; then follow chapters on transmitters, receivers, propagation, antennae, aids to navigation, television and acoustics. The only chapters which give information relating to purely American practice are those on transmitters and receivers, but even here most of the information is of a general character.

This is an excellent, comprehensive, up-to-date textbook on the fundamentals of radio communication, but it is highly priced for the student.

Shorter Notices

The following have been issued by Chapman & Hall, Ltd. (London): " Automatic Protection of A.C. Circuits," by G. W. Stubbings. (Pp. 311; figs. 210.) Price 15s. " Principles of Radio," by K. Henney. (Pp. 495; figs. 311.) Price 17s. 6d. " Mathematics for Electrical Students," by H. M. Keal and C. T. Leonard. (Pp. 222.) Price 8s. " Direct and Alternating Current Potentiometer Measurements," by D. C. Gall. (Pp. 225; figs. 109.) Price 15s. " Fine Structure of Matter." by C. H. Douglas Clark. (Pp. 457; figs. 94.) Price 15s.

In the Courts

Gas Rings on Electric Cookers

In the Court of Appeal, before the Master of the Rolls, Lord Justice Clauson and Mr. Justice Luxmoore on February 10th, there was in the list for hearing an appeal by the Egham and Staines Electricity Co., Ltd., from the judgment of Mr. Justice Farwell in the Chancery Division dismissing the action which the company brought against the Gas Light & Coke Co. for an injunction to restrain the defendant company from procuring or inciting any person who had entered into agreements with the plaintiffs for the hire of electric cookers to permit the affixing to these cookers of apparatus known as the "Calthorpe hotplate" or any similar apparatus in breach of the said agreements; a declaration that the affixing of the "Calthorpe hotplate" to electric cookers at certain consumers' houses or elsewhere constituted a breach of Regulation 25 of the Electricity Supply Regulations, 1934; and damages for procuring breach of contract or other relief.

The defence was a denial that the terms and conditions on which the plaintiffs supplied electric cookers on hire were known to defendants at any time material to the proceedings. They admitted that they had supplied gas hotplates to six persons, but denied that they had induced any consumer of plaintiffs' to break any agreement. They also denied (as the plaintiffs alleged) that the attachment of the hotplates to the electric cookers prevented the maintenance of the electric cookers in a safe condition or that the plaintiffs had suffered any damage.

At the trial of the action (reported in the ELECTRICAL REVIEW of July 23rd, 1937) it was stated on behalf of the defendants that the "Calthorpe" apparatus was back history and that the "Argyle hotplate" would in future be issued and used in the district. Mr. Justice Farwell dismissed the action with costs subject to an undertaking by the defendants that no more "Calthorpe hotplates" would be issued in the Egham district.

When the case came before the Court of Appeal, Mr. Tylor, for the appellants, the Egham and Staines Electricity Co., announced that a settlement of the appeal had been arrived at. He said that the judgment of Mr. Justice Farwell incorporated a certain undertaking by the respondents to the appeal (the defendants). Negotiations with regard to an extension of that undertaking had been progressing between the parties and they had arrived at terms the previous night which made it unnecessary for the appeal to be argued. He therefore asked that it should be dismissed without costs.

Mr. Hull, for the respondents, agreed, and their Lordships made an order accordingly.

Disclosure of Secret Process

In the King's Bench Division on Monday last, Mr. Justice Porter awarded British Industrial Plastics, Ltd., £15,000 damages, with costs, against Mr. S. W. Doherty, a former employé of the company, for breach of an agreement and disclosure to Messrs. James Ferguson & Sons, Ltd., by whom he was engaged, of a secret process of the plaintiff company for the production of aminoplastic powders.

Messrs. Ferguson and Mr. J. E. Ferguson, who were joined as co-defendants, had judgment entered in their favour, his Lordship holding that they had no fraudulent intention, and were now actually using a different chemical, although the process had proved useful, and was admittedly the basis on which Messrs. Ferguson had founded their process.

Leave was given to join the Beetle Products Co., Ltd., as co-plaintiffs, and his Lordship said that if a claim for an injunction against Messrs. Ferguson were pressed, he would hear the arguments later.

Claim Against a Gas Manager

Sheriff Hamilton, Paisley, on February 8th, heard agents in a case in which Mr. Robert Maclaurin, the inventor of a low-temperature carbonisation process, sues Mr. John W. McLusky, Glasgow Corporation gas manager, for £10,000 as damages. The plaintiff stated that when the Gas and Electricity Departments of the Corporation became interested in his process as a means of reducing the cost of gas for domestic and industrial purposes, and also for producing smokeless fuel, it was agreed by these Departments to carry out a joint test in 1915. For this purpose a Maclaurin unit was erected at Port Dundas electric power station, but on account of the war the experiments were interrupted. In 1921 respondent was instructed to proceed with the test, and in 1922 plaintiff submitted an estimate for the erection of a five-unit plant. The plaintiff says that the respondent was evidently favourably disposed to the use of the Maclaurin process, but early in 1922 his attitude changed and he opposed the process and endeavoured to prevent it being tried. It was further alleged that a report was so drafted by the respondent as to convey the impression that the process had failed to fulfil the claims made for it and was likely to cause heavy loss to the Corporation owing to its inability to produce a good marketable smokeless fuel. When the plant was advertised for sale, plaintiff made an offer to take over the plant and run it on certain specified conditions, but this offer was rejected. In conclusion, the plaintiff stated that the publication of false, malicious, and calumnious statements had caused him serious loss, injury and damage.

In the answers for respondent it was stated at no time did he use his influence unjustly to prevent the use of the process, and had it become commercially sound he would never have had any hesitation in recommending its use. They were disappointed in their expectancy that the Electricity Department would utilise the gas to be produced in the boilers of that Department. The respondent was in no way responsible for the decision of the Electricity Department. If the report made by respondent created the impression that the working of the plant would result in a loss, the report was an intelligent anticipation of what in fact occurred.

In the legal discussion respondent's counsel suggested that the slander, if it were uttered at all, had been uttered by one to whom the Public Authorities' Protection Act applied; that the alleged slanders had been made on privileged occasions; that there was no allegation of malice; and that respondent was acting in virtue of the Glasgow Gas Acts. He contended the action should be dismissed.

Plaintiff's agent said the claim was not a claim of slander on the plaintiff—it arose purely through the slander on the invention. The agent held that he had sufficiently averred malice to take the respondent out of the protection of the Public Authorities' Protection Act and leave him open to attack as an ordinary citizen.

The Sheriff was to consider whether an inquiry was necessary.

Possible Danger from Fault Current

In the Chancery Division on February 11th Mr. Justice Simonds had before him a motion on behalf of British Celanese, Ltd., claiming against the Derbyshire and Nottinghamshire Electric Power Co. an interlocutory order that the defendants should only supply electricity to the plaintiff's factory at Spondon, Derbyshire, from the defendants' generating station at Spondon from an isolated generator or by such other means as should be practical to minimise effectively the danger at present existing to the plaintiffs' servants and agents, works and electrical system by reason of the defendants supplying electricity in such a way, or under such conditions as were not proper or effective to prevent such a faulty input in excess of the existing capacity of the protective apparatus in the plaintiffs' electrical system.

Mr. W. P. Spens, K.C., for the plaintiffs, said that the case arose out of a dispute between the parties going back to 1935. The plaintiffs being one of the largest consumers of electric power in the country, were compelled to keep their electrical plant in such a state as to prevent any danger to their employés. All consumers were liable to receive a surge of electric power from the company which supplied it and safety apparatus had to be installed. As the present was not the only case of its kind it was of great importance to all consumers. The defendants had increased the generating capacity of their station from time to time, so subjecting the plaintiffs' protective apparatus to a surge of 800,000 kVA, whereas it was only capable of dealing with 250,000 kVA. The defendants, however, denied that they were liable in any way.

Recently the plaintiff's works had been visited by a Home Office factory inspector and a prosecution was threatened unless something was done. The question to be decided was what could be done pending the trial of the action. His (Counsel's) submission was that the only practical course was to supply the power from an isolated and separate generating station.

Mr. Evershed, K.C., on behalf of the defendants, contended that no mandatory injunction should be granted by way of interim relief Under the scheme of the Electricity Supply Act of 1926 the Central Electricity Board was the supplier of electric power and what the defendants did was to supply the plaintiffs under a provision of the Act, enabling them to buy back from the Board the electricity which they generated. The capacity was what was put into the grid by the Board who made arrangements with the owners of selected generating stations, and the defendants' station at Spondon was one of them. Under the relevant sections of the Act of 1926 the owners of selected stations were bound to generate such quantities of electricity at such voltages as the Board directed and sell to the Board at fixed prices.

If his Lordship thought there was any danger to human life he (Counsel) would like to have the opportunity of discussing the matter with the plaintiffs. The defendants did not like to run the risk of upsetting the supply to the rest of the community in that area by placing plaintiffs' factory on a separate generator.

His Lordship intimated that it was a case in which an arrangement should be made and Mr. Evershed suggested that any injunction granted should be suspended until February 15th to enable the defendants to consider what steps they should take. His Lordship said he would make no order that day but he would deal with the case again on either February 15th or 18th.

On Tuesday last Mr. F. W. Wallace, for the defendants, said that his clients had decided not to proceed further with the opposition to the motion. Technical experts on both sides were meeting, and it was hoped that by next Friday (February 18th) they would be able to mention to his Lordship an agreed form of order.

His Lordship expressed his satisfaction with this arrangement.

British Overseas Electrical Trade

The year begins with a 44 per cent. rise in the value of exports, imports decreasing slightly

JANUARY was an exceptionally busy month in the shipping of electrical equipment to overseas markets. Compared with a year ago, the total value of exports (£1,863,552) was up by £567,595, or 44 per cent., and was higher than in any January since at least 1924. Also, whereas British exports as a whole were less than in December, this was not the case with electrical equipment; in fact, January brought the fifth consecutive monthly expansion. It should be pointed out, however, that in January, 1937, exports were of a lower value than for several months previously.

Shipments of goods and apparatus to seven countries were worth more than twice as much as in January, 1937, most notable being the increases from £64,593 to £132,384 to New Zealand and from £9,132 to £43,375 to Denmark. The Board of Trade returns now show Palestine and British West Africa separately. The former does not begin on a favourable note, but electrical development there, now being tackled in earnest, should make the market well worth attention, and the monthly returns will no doubt be followed with interest.

December's high value for exports of wires and cables was well exceeded by that for January, which amounted to more than a quarter of the total. Compared with the corresponding month of last year, the increase was over 80 per cent. (excluding submarine cables, 60 per cent.). The countries chiefly responsible are shown in the accompanying analysis of shipments of wires and cables other than for telegraphy and telephony, with values for January, 1937, in parentheses:

Rubber insulated wires and cables.—Australia, £40,699 (£29,435); British India, £19,403 (£16,234); South Africa, £17,423 (£20,742); New Zealand, £9,140 (£8,375); other British countries, £21,392 (£14,211); and foreign countries, £25,220 (£7,498).

Insulation other than rubber.—South Africa, £50,484 (£36,230); Australia, £41,373 (£21,406); British India, £33,782 (£24,895); other British countries, £30,850 (£24,097); and foreign countries, £31,219 (£18,245).

There was a further improvement in radio exports, accompanied by a general fall in imports of this kind. The number of sets shipped abroad (not radio-gramophones) rose from 5,551 to 8,476, and valve exports increased in number from 115,790 to 181,826. In value, radio shipments improved by £54,802.

There were larger consignments of telegraph and telephone apparatus other than radio to all chief markets for this type of equipment, as the following analysis reveals:—Australia, £62,462 (£41,106); Argentina, £24,896 (£6,475); South Africa, £15,600 (£8,037); other British countries, £62,407 (£31,495); and other foreign countries, £79,353 (£70,991).

There was further expansion in the value of cooking and heating apparatus sent abroad, and although the fall in meter exports continued, electrical instruments as a whole showed improvement, and in the case of unenumerated electrical apparatus the comparison with January, 1937, is especially favourable. A new classification "insulating materials not elsewhere specified" is introduced, and in this the tendency is also upward.

In each of the major machinery sections there was a rise last month both in weight and value, the former improving in the aggregate from 2,645 to 3,639 tons and the latter from £446,814 to £603,943. Although the recent decision to obtain large generating plant for the Kiewa scheme from Switzerland was not good news, Australia is seen to have been our best customer for such plant last month. With motors, India was primarily responsible for the increased value, South Africa leading in other machinery. Shipments of switchgear, convertors and transformers were exceptionally heavy last month.

On the other hand, imports in January were lower for the third successive month. Cables, radio apparatus, lamps, instruments and vacuum cleaners all shared in the reduction. Germany maintained the position of chief supplier of goods and apparatus, as shown in the following analysis:—Germany, £73,253 (£68,664); United States, £69,593 (£69,375); Netherlands, £46,866 (£72,112); Belgium, £17,186 (£18,215); Switzerland, £15,696 (£16,357); France, £5,599 (£5,842); Austria, £3,272 (£4,910); other foreign countries, £25,005 (£22,257); and British countries, £5,885 (£17,150).

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TABLE I.—EXPORTS AND IMPORTS DURING JANUARY.

	Exports. Jan., 1938.	Exports. Inc. or dec. compared with Jan., 1937.	Imports. Jan., 1938.	Imports. Inc. or dec. compared with Jan., 1937.
Submarine telegraph and telephone cables	£62,583	+ £61,684	*	—
Telegraph and telephone wires and cables (not submarine)	95,361	+ 55,336	*	—
Other insulated wires and cables	320,985	+ 99,617	£29,648	— £2,054
Radio receivers, not radiograms (excluding valves)	41,255	+ 10,922	8,340	— 9,282
Radio transmitters (excluding valves)	30,428	+ 15,440	*	—
Radio valves	36,236	+ 5,726	9,048	— 6,414
Other radio parts and accessories	51,790	+ 22,714	43,388	— 30,961
Telegraph and telephone apparatus (other than radio)	244,718	+ 86,614	*	—
Electric carbons	*	—	8,053	— 1,859
Incandescent lamps	51,378	+ 2,428	11,450	— 6,378
Other lighting apparatus	44,752	— 3,485	41,603	+ 5,728
Primary batteries	9,998	— 5,106	*	—
Accumulators	56,670	+ 9,302	*	—
Electric cooking and heating apparatus	32,971	+ 9,596	*	—
House service meters	13,694	— 1,445	*	—
Other electrical instruments	20,339	+ 5,493	26,193	— 3,025
Insulating materials not elsewhere specified	14,004	+ 2,845	*	—
Unenumerated electrical goods and apparatus	132,447	+ 32,785	84,632	+ 21,718
Electric generators up to 200 kW	32,425	— 11,411	*	—
Electric generators over 200 kW	82,821	+ 16,228	*	—
Electric motors	129,965	+ 22,922	32,823†	+ 6,499
Convertors and transformers	116,696	+ 58,427	*	—
Starting and controlling gear for motors	28,965	— 13,009	*	—
Switchgear	180,884	+ 79 711	*	—
Other electrical machinery	12,344	— 5,173	19,548	+ 4,098
Electric vacuum cleaners	19,843	+ 9,434	12,604	— 3,637
Total	£1,863,552	+ £567,595	£327,330	— £25,567

* Not classified separately. † Not railway and tramway motors.

TABLE II.—BRITISH ELECTRICAL EXPORTS DURING JANUARY.

Destination.	Goods and apparatus, Jan., 1938.	Inc. or dec. compared with Jan., 1937.	Electric generators, Jan., 1938.	Inc. or dec. compared with Jan., 1937.	Electric motors, Jan., 1938.	Inc. or dec. compared with Jan., 1937.	Other electrical machinery, Jan., 1938.	Inc. or dec. compared with Jan., 1937.
Eire	£19,536	+ £14,295	*	—	*	—	*	—
Channel Islands	9,858	— 4,604	*	—	*	—	*	—
Palestine	10,995	— 5,905	*	—	*	—	*	—
British West Africa	10,302	+ 619	*	—	*	—	*	—
Union of South Africa	159,427	+ 39,234	£9,447	— £14,972	£34,492	— £6,403	£116,762	+ £43,963
British India	146,756	+ 39,304	25,277	— 15,341	21,013	+ 12,475	38,128	+ 11,329
British Malaya	35,382	+ 4,918	*	—	*	—	11,076	+ 4,019
Ceylon	10,231	+ 2,661	*	—	*	—	*	—
Hong Kong	10,779	+ 2,406	*	—	*	—	*	—
Australia	213,949	+ 75,062	35,145	+ 29,064	14,294	— 241	32,013	+ 7,847
New Zealand	132,384	+ 67,791	*	—	3,427	— 2,367	23,456	+ 2,914
Canada	10,340	+ 3,238	3,705	+ 1,121	6,547	+ 3,467	13,230	+ 10,043
Other British Countries	48,510	+ 15,961	21,365	— 17	20,797	+ 6,550	64,479	+ 45,555
Sweden	12,031	— 452	*	—	*	—	*	—
Denmark	43,375	+ 34,243	*	—	*	—	*	—
Netherlands	27,616	+ 15,092	*	—	*	—	4,164	+ 3,207
Belgium	12,224	+ 2,980	*	—	*	—	*	—
France	26,317	+ 9,617	*	—	*	—	1,763	— 1,908
Portugal	4,110	— 14,291	*	—	*	—	*	—
Spain	3,469	— 1,953	*	—	*	—	*	—
Italy	10,702	+ 9,871	*	—	*	—	*	—
Greece	5,725	+ 3,384	*	—	*	—	*	—
Rumania	8,001	+ 5,898	*	—	*	—	*	—
Egypt	17,046	+ 8,867	*	—	*	—	688	— 77
China	2,903	— 5,055	*	—	*	—	1,478	— 84
Brazil	9,749	— 1,085	*	—	*	—	*	—
Argentina	58,939	+ 25,868	*	—	*	—	3,905	+ 1,679
Other Foreign Countries	168,953	+ 62,502	20,307	+ 4,962	29,395	+ 9,441	27,747	— 8,531
Total	£1,259,609	+ £410,466	£115,246	+ £4,817	£129,965	+ £22,922	£338,889	+ £119,956

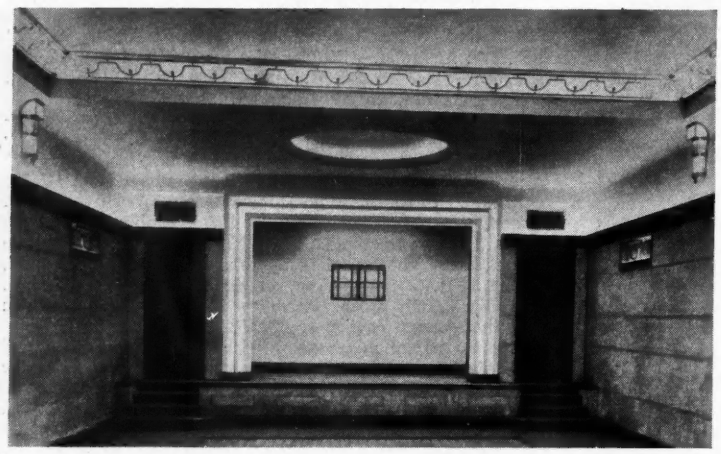
* Not classified separately. Vacuum cleaners are included in Table I but not in Table II.

Business and Industrial Notes

The Week's News. Showrooms and Exhibitions. New Installations. Overseas Trade. Publicity Material. Trade Announcements. Prices of Materials. Liquidations and Bankruptcies.

Electric Vehicle Association

The annual general meeting of the Electric Vehicle Committee of Great Britain, Ltd., was held at 2, Savoy Hill, London, on Wednesday, February 9th, when the annual accounts were presented and adopted. At an extraordinary general meeting held afterwards the change of name to The Electric Vehicle Association of Great Britain, Ltd., and the new articles of association were unanimously adopted. The first meeting of the Association followed, and officers for the ensuing year were elected as follows:—President: Col. R. E. Crompton; chairman: Col. G. D. Ozanne; vice-chairman: Major A. L. Trundle; hon. treasurer: Mr. H. M. Drake; secretary; Mr. Alex. C. Cramb; assistant secretary: Mr. John Steele. The Association also elected an executive and finance committee.



The new demonstration theatre of the Blackburn electricity showrooms

Registered Electrical Contractors

At the last meeting of the Executive Committee of the National Register of Electrical Installation Contractors the following applications for registration were accepted:—Trollope & Sons (Decorators), Ltd., West Halkin Street, Belgrave Square, London, W.1; Grundy & Partners, Ltd., Hampton Hill, Middx.; and F. H. Wheeler & Co., Ltd., 39, Victoria Street, Westminster, London, S.W.1. At the same meeting four applications were declined.

Two Better than One

The man who makes two blades of grass grow where there was only one before was once considered a benefactor to humanity. Something of the sort is being encouraged by the *Wireless Trader* which is carrying on a campaign to secure the installation of two radio sets in every home—a matter of interest to many electrical and radio dealers.

Two Wholesalers' New Premises

Brown Brothers, Ltd., report that good progress is being made in the erection of their new building in The Vale, Acton, with frontage on First Avenue. It is now a year or more since the project was first mooted, but work on the site did not begin until later in 1937. This new depôt is designed to serve the West End and western environments of London. Business in this area has grown to such an extent that it was found desirable to erect new premises which would be not only adequate for present needs but adaptable to further increases. In general construction the building follows closely that of the recently completed addition to the firm's headquarters in Great Eastern Street and has an approximate floor area of 40,000 sq. ft. A large loading dock has been provided, also a roomy garage. There are two lifts and a separate staff entrance. The basement will be used for stock, packing, &c. On the ground floor are the motor and garage equipment showrooms and counters, cellulose store, loading bay and garage. Cycle goods, electrical and radio lines and sidelines will occupy the first floor, while the second floor will be mostly used as offices, &c. The lighting arrangements in the new building were planned by Brown Brothers, Ltd., Lighting Engineering Service.

New showrooms have recently been opened by T. B. Morley & Co., Ltd., Hull. The entrance is in Chapel Street, off Jameson Street. Upon entering the visitor catches a glimpse, through illuminated arches, of carefully designed model bathrooms, model kitchenettes, and a room in which period electric lighting fittings and fires are exhibited. An all-electric kitchenette contains electric refrigerators, washers, ironers and vacuum cleaners, and here demonstrations will be given. The showrooms also include electric lighting fittings of various designs and colours for interior and exterior lighting of the home, office, shop and factory. The majority of these fittings are manufactured at the company's works, Doncaster. Display stands show, among other things, electric ironers, clocks, hair dryers, hot plates, coffee percolators, &c. In a room fitted out in period style are period lighting fittings and electric fires.

Blackburn Showroom Extension

The Blackburn Corporation Electricity Committee has completed a large extension to its electricity showrooms in Darwen Street. This will enable the Department to cope more satisfactorily with the demand for domestic electrical apparatus, which is now very popular in consequence of the attractive rates which have been adopted. The accompanying illustration gives an idea of the new assembly hall, where demonstrations are to be given week by week. Hitherto, the number of housewives desiring to attend these demonstrations has been exceptionally large, and the additional accommodation will prove of great service.

E.D.A. Activities

A preliminary announcement of three major campaigns which are being organised for 1938 is made in the March Sales and Publicity Programme of the British Electrical Development Association. These are domestic electrification, with particular reference to electric cooking, water heating and extended wiring; electric refrigeration, in collaboration with the manufacturers of refrigerators; and lighting, in collaboration with E.L.M.A. The "Spring-cleaning" double-crown poster has been reissued in response to many requests, and a new book is available entitled "Progress in Schools," which describes and illustrates examples of schools where electrical equipment is extensively used. Copies of the "Film Star" calendar are still available.

The results of the public speaking competitions held in Leeds during the past week under the auspices of the British Electrical Development Association have been announced. The judges were Miss Foster Jeffery, LL.B. (Manchester); Professor W. E. French, M.I.E.E. (Leeds University); Councillor J. M. Jolly (Wakefield); and Mr. W. M. Brown (Bridlington). The candidates, of whom ten were women and twelve men, were drawn from all parts of the Mid-East England Area, and were all in the employ of electricity supply authorities. The subjects upon which candidates were required to speak for a period not exceeding fifteen minutes were: (a) "Electric Light Means Brighter Homes and Better Sight." (b) "Why you should have Electric Refrigerators." (c) "Electricity and Kitchen Planning." The prizes in each section (men's and women's) were first, £5 and a certificate, and second, £3 and a certificate. The winners in the women's

2,500 yd. of Henley telephone cable being reeled off a 39-ton drum on to a barge alongside the company's jetty for shipment

section were :—First : Miss Doreen Pearson (York). Second : Miss E. Wilson (Hull). In the men's section the winners were :—First : Mr. G. P. Woodall (Hull). Second : Mr. E. R. Stafford (Peterborough). In the men's section Mr. W. S. Williscroft (Hull), handicapped by reason of being last year's first-prize winner from competing for the prizes, qualified by securing the highest score in points for a special prize, and will appear in the national competitions to be held in London. Addressing the competitors at the close of the auditions, Miss Foster Jeffery said that the judges had experienced the utmost difficulty in arriving at their decisions. This was due to the general level of attainment being so high. Only one point, for example, out of a possible 400 marks, separated the two prize-winners in the women's section. Professor French said that he was impressed by the ability to speak clearly and convincingly shown by the majority of the candidates. He was struck by the fact that the women developed the argument that electricity promoted happiness in the home, whereas the men emphasised the efficiency of electric service in the home.

International Management Congress

The Seventh International Management Congress will take place in Washington from September 19th to 23rd next, under the auspices of the International Committee of Scientific Management, of which Viscount Leverhulme is president. It is expected that over 2,000 persons will be present, representing about thirty countries. The Congress is being organised by the National Management Council of the U.S.A. "Recent Developments in Management" will be discussed at a series of sectional meetings grouped under the following heads : Administration, Production, Distribution, Personnel, Agriculture and the Home. "The Social and Economic Aspects of Management" will be treated at plenary sessions. In addition to the Congress itself, three tours are being organised covering respectively New England, the Central Atlantic Coast States, and the Middle West. Further information can be obtained from Mr. U. Balliol Scott, secretary, British Management Council, Room 68, Armour House, St. Martins-le-Grand, London, E.C.1.

Local Exhibition

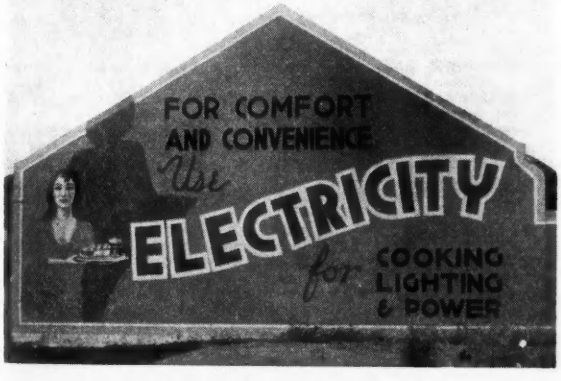
An Electric Home Exhibition is being held at the Leas Pavilion, Folkestone, during the current week. Cooking and washing demonstrations are being given, the exhibitors including the Folkestone Electricity Supply Co., Ltd., the Jackson Electric Stove Co., Ltd., the Singer Sewing Machine Co., Ltd., Frigidaire, Ltd., and Belling & Co., Ltd.

Norwich E.D.A. Circle

On February 9th forty-six members of the Norwich and District Electrical Development Circle attended a dinner at the Thatched Restaurant, Norwich, under the presidency of the city electrical engineer (Mr. V. A. Pask). Mr. Pask suggested that the Circle should organise an exhibition of electrical apparatus to coincide with the Civic Week in October, when the King and Queen will open the new Norwich City Hall. Mr. A. Pank, hon. treasurer, and Mr. R. W. Steel, A.M.I.E.E., also addressed the gathering, and reference was made to the automatic heating apparatus to be used in the City Hall.

Electrical Publicity in Singapore

The popularity of domestic electrical appliances in Singapore is indicated by the accompanying illustration of an effective hand-painted advertisement which covers the entire gable of a house. These hoardings are executed by Chinese artists and prove an excellent medium for propagating the electrical idea.



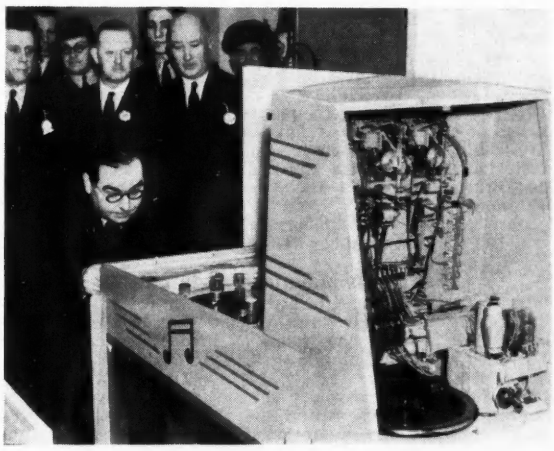
A hand-painted hoarding in Singapore

Netherlands East Indies Lamp Imports

The *Board of Trade Journal* reports that the Commercial Agent at Batavia has forwarded a translation of the "Electric Bulbs Imports Ordinance, 1938, which provides that during twelve months from January 18th the importation into the Netherlands East Indies of electric lamps in excess of the following quantities is prohibited :—For cycle and flash lamps, 10,000,000; for motor vehicle lamps, 200,000; and for ordinary lighting, 3,000,000. Of these quantities at least 110,000 motor vehicle lamps and 1,650,000 ordinary lamps have been reserved for imports manufactured in Holland.

The Amusement Trades' Exhibition

No fair, amusement park or similar establishment can be considered up-to-date unless the greater portion of its equipment is electrically operated. In fact, at the Amusement Trades' Exhibition held at the beginning of this week at the New Royal Horticultural Hall, Westminster, there was scarcely an appliance not requiring electricity for some purpose or another. Almost without exception the various forms of "pin-table," skittles and roulette games have electrical indicators for scoring or announcing prize-winners, some of the relay equipment incorporated for totalling being so intricate as to resemble an automatic telephone exchange. Electric motors are employed extensively to drive the operating mechanism, while microphones and amplifiers are proving an indispensible part of the showman's equipment. One ingenious variation of pin-table we saw is arranged to switch on a gramophone record when a certain score is reached. Most of the miniature cars, which were to be seen with different types of racing bodies, were electrically driven. Although of particular interest to cinemas and theatres, the "Lafleur" theatre organ can be dismantled in a few minutes and easily transported from place to place without risk of damage. The 250 million or so tonal variations possible are all created by the Hammond electric tone generator, no reeds, pipes, wind or tuning being required.



Lord Strabolgi trying his luck on a new type of electric "pin-table" at the Amusement Trades' Exhibition. A tune is played when a certain score is reached

Social Events

The annual staff dinner and dance of Ferranti, Ltd., was held at the Midland Hotel, Manchester, on February 4th. Mr. and Mrs. V. Z. de Ferranti received their guests to the number of about 450 including many prominent people in the electrical world. Mr. de Ferranti, in his speech, referred to the satisfaction which he and his co-directors had found in the introduction of a staff pension scheme, and also to the big extensions which it had been found necessary to build to accommodate the large amount of new work which had been undertaken. The toast of "The Ferranti Company" was proposed by Mr. F. Forrest, city electrical engineer of Birmingham, who spoke of the pleasure which he had derived from his very long association with the Ferranti Company, and mentioned the interesting fact that Dr. Ferranti's first entry into the electrical manufacturing industry was with Siemens Bros., of Woolwich, where he worked under Mr. Forrest's father. Mr. Forrest, senior, is still enjoying good health at the age of ninety-two. Mr. Kolle replied for the company, and related some of his early reminiscences connected with Ferranti's work at Deptford. Mr. C. W. Bridgen proposed the toast of "The Guests," and Mr. A. Ellis responded. The toast of "The Chairman," received with musical honours for Mr. and Mrs. de Ferranti, was proposed by Mr. R. J. Hibbert. The evening concluded with dancing.

The annual dinner of the D.E.L.S. Sports Association (employés of Dartford Electricity Department) was held on January 29th and was attended by 88 people, Mr. F. H. Edwards, borough electrical engineer and manager, presiding. Councillor A. F. Taylor proposed the toast of the club, and Mr. F. H. Edwards responded. Decorations were carried out by the Department with approximately 400 40-W coloured lamps, streamers and balloons. Dancing, an entertainment and games took up the rest of the evening.

Recently at the Princes Galleries, London, over 120 members of the staff of the City of London Electric Lighting Co., Ltd., and their friends, enjoyed to the full the annual dance of the company. Among those present were Mr. H. J. Randall, manager and secretary, Mr. A. G. Kemsley, distribution engineer and Mr. J. Lesser, sales manager. With his special flair for the duties of M.C. Mr. E. S. Parsons added to the success of the function.

The Clesco Light Operatic and Dramatic Club (the staffs of the County of London Electric Supply Co., Ltd., and its associated companies) will give a performance of the musical play, "The Street Singer," at the Fortune Theatre, Drury Lane, on February 24th, 25th and 26th.

Trade Announcements

By a mutual agreement General Refractories, Ltd., has ceased to act as agent for the insulating materials of Moler Products, Ltd. The latter company now deals direct with all its sales, and inquiries for "Fosalsil" and "Insulite" products should be sent to Moler Products, Ltd., 103, Kingsway, W.C.2.

Speedy and Eynon, Ltd., electrical and mechanical engineers, have opened a new branch at Bellman Buildings, 39, Carrs Lane, Birmingham, 4, and ask for manufacturers' catalogues.

From February 21st the head office and showrooms of the Cambridge Instrument Co., Ltd., will be at 13, Grosvenor Place, London, S.W.1.

Kettles-Ray & Tyson (Mombasa), Ltd., Box 100, Nairobi, Kenya Colony, East Africa, have been appointed agents for the Brush Electrical Engineering Co., Ltd., in Kenya, Uganda Protectorate, Tanganyika and Zanzibar, and they will handle the Brush Company's Diesel engines in the territories mentioned.

Marelli & Co., Ltd., announce that their telephone number has been changed to Abbey 5478.

The Polish Manufacturing Industry

The electrical manufacturing industry in Poland made further progress last year. The Warsaw *Gazeta Handlowa* reports that in 1935 the value of production amounted to 90,474,000 zlotys and in 1936 to 122,843,000 zlotys. In 1937 it is estimated to have reached 160,000,000 zlotys. The comparison of values, however, is not considered to give a correct impression of the growth in the production, as the prices declined owing to the improvement in the processes of manufacture, so that a better comparison lies in the volume of the output. The statistics for the eleven months ended with November are given in the accompanying table:—

Tonnage in	January to November. 1936.	1937.
Electric machines	961	1,621
Transformers	495	779
Accumulators	1,474	1,622
Cables	6,248	7,135
Conductors	1,947	2,776

Increased orders were obtained in the face of strong foreign competition, but they were not very remunerative. Imports from abroad in 1936 showed a large expansion as the result of the improvement in the economic situation and the electrification of the Warsaw railway network. The value of the imports in 1935 amounted to 26,583,000 zlotys, in 1936 to 37,244,000 zlotys, and in the first eleven months in 1937 to 35,500,000 zlotys; during the last two years Germany has again occupied first place as supplier. It is expected that the national industry will further expand his year and that imports will diminish. (26 zloty approx. = £1.)

Orders Recently Booked

The whole loud speaker installation used in Madras to relay the proceedings at the recent National Eucharistic Congress of India, Burma and Ceylon was supplied and installed by the Madras branch of the General Electric Co. (India), Ltd. Over 50,000 spectators in the enclosure heard the Archbishop of Madras by means of the loud speakers and were able to listen to the singing of the choirs. After the congress a diploma was presented to the General Electric Co. (India), Ltd.

Lamp Publicity

The Edison Swan Electric Co., Ltd., has sent us two packs of playing cards on the backs of which (in red and blue) are the portraits of Thomas A. Edison and Sir Joseph Swan. On the cases brief reference is made to the amalgamation of the interests of Edison and Swan in 1883 and to the present-day "Royal Ediswan" lamp.

An Engineers' Directory

"The Directory and Buyers' Guide, 1938," which has just been published by *The Engineer*, contains a classified list of engineering concerns in this country with their addresses. This list is preceded by one giving translations in French, German, Italian and Spanish of the technical headings used in the directory. There are also alphabetical lists of advertisers' telephone numbers and telegraphic addresses, and of telegraphic addresses with particulars of some of the codes used. The directory is issued free of charge.

The Progress of Illuminating Engineering

Mr. F. S. Ette gave his presidential address before the Birmingham Electric Club on January 31st, when his subject was "The Romance of Illuminating Engineering." He said he did not propose to cover the manufacturing processes which had brought about improvements in the electric lamp, but rather the various light sources which had developed through the years. With the aid of lantern slides he demonstrated the progress made in the method of control, with some references to applications, including observations upon the early types of electric light fittings, and remarked that when one considered the great strides that had been made in electric lighting, one must agree that in no other branch of the industry had so much been done to stimulate electrical progress.

Russian Electrical Imports

A return lately to hand shows that the imports of electrical machinery and apparatus into Russia during the nine months ended with September last attained a value, taking roubles at 10 to the £, of £3,552,900, as compared with £4,663,200 in the corresponding period of 1936.

"Financial Times" Jubilee

On Monday last the *Financial Times* celebrated its golden jubilee, and to mark the occasion issued a special 88-page supplement containing forty articles by well-known authorities in the various branches of industry. Among the contributors are Mr. J. W. Beauchamp, who reviews the evolution of electric public utility service and the inception and work of the Central Electricity Board. Other articles include "Cable and Wireless Communications," by Lord Inverforth, "London Transport," by Lord Ashfield and "Science of Sound Reproduction," by Mr. A. Clark.

Composite Aircraft Release

Much forethought has been given to perfecting a release mechanism which permits separation of the two components of the Mayo composite aircraft and the actual series of operations is controlled electrically. The entire electrical equipment, including the electrically controlled indicator and the telephone inter-communication system, are wired with Callender cable, the total installation needing about 4,000 ft. of various types.

For Sale

Martin & Stratford will sell the contents of an electrical workshop by auction on February 24th.

Chesterfield Transport Department has for sale one 150-kW Hewittic mercury-arc, two-bulb rectifier equipment.

Manchester Electricity Department has for disposal a rotary convertor and transformer, two motor convertors and second-hand d.c. motors and starters.

(See our Classified Advertisements.)

Parolle Electrical Plant Co.

The Parolle Electrical Plant Co., Ltd., has been formed with an authorised capital of £100,000 to be subscribed by C. A. Parsons & Co., Ltd., and A. Reyrolle & Co., Ltd., equally. The company is to take over the whole of the contracting business of the existing company of the same name which has gone into voluntary liquidation for purposes of reconstruction. The shares in C. A. Parsons & Co., Ltd., held by the old company have been acquired by A. Reyrolle & Co., Ltd. There will be no change in the management.

Prices of Materials

Henry Gardner & Co., Ltd., report, February 16th: Copper bars (best selected), sheet and rod, £73, £2 decrease. English pig lead, no change. Spelter, £13 12s. 6d., 7s. 6d. decrease. English block tin, £181 5s., £2 10s. increase.

Frederick Smith & Co. report, February 16th: Electrolytic copper bars, £43, 15s. decrease. Ditto, ditto, wire rods, £48, 15s. decrease. Ditto, ditto, h.c. wire, 7⅛d., ¼d. decrease. Silicium bronze wire, 8⅝d., ¼d. decrease.

Edward Till & Co. report, February 16th: India-rubber, Para fine, 6⅜d., ⅛d. decrease.

New Catalogues

Hopkinsons, Ltd., Huddersfield.—Leaflets regarding boiler safety valves.

Brookhirst Switchgear, Ltd., Northgate Works, Chester.—A cut-out folder illustrating control gear for ships.

Marelli & Co., Ltd., Artillery House, Artillery Row, Victoria Street, London, S.W.1.—A leaflet dealing with various types of fractional h.p. motors, electric syrens and small centrifugal blowers.

British Insulated Cables, Ltd., Prescot.—A folder describing service cut-outs with non-conductive cases.

G. Bray & Co., Ltd., Leeds, 2.—A 31-page illustrated catalogue of electric heating elements and equipments of all kinds.

Richard Crittall & Co., Ltd., Bush House, London, W.C.2.—A leaflet regarding "Dulrae" invisible electric panel warming equipment.

Crofts (Engineers), Ltd., Thornbury, Bradford.—A booklet (pp. 40) describing internal gear type all-metal flexible couplings.

Marconi-Ekco Instruments, Ltd., Electra House, Victoria Embankment, London, W.C.2.—Leaflets dealing with universal impedance bridge and valve voltmeters.

British Rototherm Co., Ltd., Merton Abbey, London, S.W.19.—In connection with the requirement of the new Factory Act that a certain temperature is to be maintained in all workrooms a leaflet dealing with thermometers has been issued.

F. W. Thorpe, Ltd., 39, Bolton Road, Small Heath, Birmingham, 10.—Leaflets appertaining to reflectors for electric-discharge lamps of all kinds.

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne, have issued catalogue sheets for load devices, instruments, transformers, and automatic service equipment, replacing the miscellaneous section.

E. A. Wood, 100, Aston Road, Birmingham, 6.—An illustrated leaflet on industrial and commercial lighting fittings.

Ray-o-Therm Co., 20, High Holborn, London, W.C.1.—Details of a low-priced rheumatism lamp.

Bankruptcy Proceedings

R. Terrell, electrical apparatus manufacturer, 56, Queen's Avenue, N.10.—This debtor attended at the London Bankruptcy Court on February 8th before Mr. Registrar Parton for public examination upon accounts showing total liabilities of £1,185 and a deficiency of £650. Replying to the Official Receiver, the debtor stated that in November, 1932, he assisted in the formation of C.E.L., Ltd., which was formed for the purpose of manufacturing electrical apparatus. He received an allotment of 125 £1 shares in the company for services rendered and acted as one of its directors until April, 1936, when he ceased to be a director. He had also acted as a director of three other companies. In June, 1936, C.E.L., Ltd., instituted proceedings against him for an injunction to restrain him from acting as a director of the company. He defended the proceedings but in May, 1937, damages and costs amounting together to £560 were entered against him and these proceedings followed. He entirely attributed his failure to his liability under the judgment. The examination was concluded

E. C. Mould, trading as Empire Electrical Co., 24, Westrow Gardens, Seven Kings, Essex, electrical retailer, lately 28, Clements Road, Woodford, Essex, and The Facade, High Road, Goodmayes, Essex.—At the public examination herein held recently at the Shire Hall, Chelmsford, it was reported that the liabilities amounted to £2,686, leaving a deficiency of £2,660. Debtor stated that having previously been sales promotion manager for a firm of electrical manufacturers, he started an agency for selling cleaners in February, 1934, with £100 capi- He later took over offices in York Road, Ilford, trading as the Empire Electrical Co., and in December, 1934, commenced selling radio sets on commission. The hearing was adjourned for an amended statement of affairs to be prepared.

N. Hodgson, 3, Gurney Street, Middlesbrough, electrical and wireless engineer.—The public examination was held at the Court House, Wilson Street West, Middlesbrough, on January 28th. Debtor said his liabilities amounted to £284 and his assets to 3s. 6d. He added that he was previously made bankrupt in 1922, and had not obtained his discharge from those proceedings. He attributed his failure mainly to losses in battery charging and repairs. The examination was adjourned.

J. H. Metcalf, radio dealer, 82, Clinedon Avenue, Perry Barr, lately trading at 261, High Street, Smethwick, and 171, Summer Lane, Birmingham.—Receiving order made February 3rd on debtor's own petition. First meeting February 18th at 159, Great Charles Street, Birmingham. Public examination March 4th at the Law Courts, West Bromwich.

W. F. Buttery, electrical contractor, 34, Holme Lane, Dudley Hill, Bradford, lately trading at 293, Tong Street, Dudley Hill, Bradford.—Receiving order made February 7th on debtor's own petition.

J. E. Madden, radio dealer, 113, Bradford Road, Huddersfield. —Last day for receiving proofs for dividend, February 26th. Trustee, Mr. G. W. Smith, 23, John William Street, Huddersfield.

E. Nelson (Elizabeth Nelson & Son), electrician, 63, Wharton Street, South Shields.—Public examination March 17th at the County Court, Sunderland.

Company Liquidations

Norwich Wireless Co., Ltd., 115-117, Cannon Street, London, E.C.4.—A meeting of the creditors was held on February 8th at the Institute of Chartered Accountants, Moorgate Place, London, E.C., when Mr. P. Kay, the sole director of the company, presided. It was reported that the shareholders had passed the usual resolution for the voluntary liquidation of the company and Mr. C. Latham and Mr. G. Lowe had been nominated as joint liquidators. The statement of affairs showed ranking liabilities of £3,116. The net assets were £982, leaving a deficiency, so far as the creditors were concerned, of £2,134. A receiver had been appointed on behalf of the debenture holder. Resolutions were passed in favour of the voluntary liquidation of the company being confirmed, with Mr. Latham and Mr. Lowe as joint liquidators. A committee was appointed consisting of the representatives of Philips Lamps, Ltd., Philco (Southern Distributors), Ltd., and Ferranti, Ltd.

Central London Electricity Distribution Committee, 1934, Ltd.—Winding up voluntarily. Liquidator, Mr. F. H. Wood, 11, Maiden Lane, W.C.2.

Automobile & Home Radio, Ltd.—Winding up voluntarily. Liquidator, Mr. A. C. Lucas, Brettenham House, Waterloo Bridge, Strand, W.C.2.

Milnes Radio Co., Ltd.—Winding up voluntarily. Liquidator, Mr. W. Driver, 63, Great George Street, Leeds.

T. Baxter, Ltd.—Winding up voluntarily. Liquidator, Mr. N. W. Osborne, 11-12, Finsbury Square, E.C.2.

Radio & Musical Services (Carmarthen), Ltd.—Meetings, March 10th at 49, King Street, Carmarthen, to receive an account of the winding-up by the liquidator, Mr. D. T. Owen.

Pontet Insulation Co., Ltd.—Winding up voluntarily. Liquidator, Mr. R. T. Cuff, 17, Bedford Row, W.C.1.

Aerodyne Radio, Ltd.—Particulars of claims by March 23rd to the liquidator, Mr. W. H. Cork, 19, Eastcheap, E.C.

Harrow Electric Light & Power Co., Ltd.—Meeting March 15th at Caxton Hall, Westminster, S.W.1, to receive an account of the winding-up by the liquidator, Sir James Devonshire.

Sylvex, Ltd.—Meetings March 7th at 19-22, Finsbury Court, Finsbury Pavement, E.C.2, to receive an account of the winding up by the liquidator, Mr. F. W. Inns.

Private Arrangements

L. Bass, trading as Lawie & Co., Adelaide House, 2, Albert Road, Bournemouth, factor of wireless apparatus, &c.—A meeting of the creditors was held on February 10th at the Connaught Rooms, London, W.C. Mr. E. G. Pulsford, of 233, High Street, Poole, submitted a statement of affairs which showed liabilities of £3,839. The total assets were £1,652, leaving a deficiency of £2,187. Debtor attributed his present position to the fall in the turnover brought about by the loss of several agencies. He had also suffered through the restriction of discounts to an uneconomic level, heavy losses through bad debts and obsolete stock. His stock on January 1st, 1936, was £5,516, a large proportion being sold at a loss owing to obsolescence. Last December his bankers restricted his overdraft and, faced with a further reduction in turnover due to the bad trading season, he ultimately found it impossible to meet his commitments. He submitted an offer of 6s. 8d. in the £, payable in three months, by three instalments, but after some discussion amended his offer to one of 5s. in the £, payable as to 2s. 6d. in fourteen days and the balance in two months, and secured. It was decided that the amended offer should be accepted and Mr. N. W. Osborne, of Rushton, Osborne & Co., 11-12, Finsbury Square, London, E.C., was appointed to act as the trustee on behalf of the creditors.

L. Hyman, electrician and radio engineer, 391, Stockport Road, Longsight, Manchester, and 383, Bury Old Road, Prestwich.—The creditors in this matter met recently at the Memorial Hall, Albert Square, Manchester. The statement of affairs showed unsecured liabilities of £1,994; the net assets were £272. The debtor, it was reported, commenced trading at Bury Old Road in July, 1932, when he had a capital of £60. The Stockport Road branch was opened in August, 1937. The present position was attributed to the decorating and fitting of the Stockport Road shop, which cost £250, recent bad trade, losses on exchanges, and by defaults, and ill-health of his mother. One creditor had commenced proceedings and in order to protect the assets a deed of assignment had been executed. An offer was made of a composition of 2s. in the £, which was not accepted. It was decided to appoint a committee to go into the matter and if satisfied that an offer of 4s. in the £, which it was understood was available, was reasonable, payable as to 2s. in cash and 2s. in six months, and secured, that this should be communicated to the creditors generally for their consideration. If, however, the assets were thought to be worth more, steps were to be taken by the committee to secure a better offer.

Dissolution of Partnership

George North & Co., electrical contractors, Balm Road Parade, Hunslet, Leeds.—Messrs. G. E. North and A. R. & A. E. Jackson have dissolved partnership so far as concerns Mr. North, who retires from the firm. Messrs. A. R. & A. E. Jackson will attend to debts and carry on the business under the same style.

Parliamentary News (BY OUR SPECIAL REPORTER)

Greater London Area Undertakings

In the House of Commons on February 9th, Mr. D. Somerville asked the Minister of Transport what official information he had indicating that local authorities in the Greater London area were voluntarily discussing the amalgamation of their electricity undertakings and could he give details.

Mr. Burgin said he understood that various authorities, in London as well as in other parts of the country, had been discussing with one another the possibilities of future grouping of electricity undertakings. Such discussions had been informal and he was not in a position to give any details.

Southampton Relay Scheme

On February 14th Sir R. Clarry asked the Postmaster-General by what date he expected to be in a position to state whether the experiment in the working of a system of wireless relay in Southampton was a success or failure.

Major Tryon said that the arrangements were being pressed forward with all practicable speed, but he could not, at this stage, forecast a date by which it would be possible to judge what measure of success had attended the experiment.

Mr. Marcus Samuel asked the Postmaster-General if he was considering a national wireless relay system on the same basis of cost as Southampton; and what was the standard cost.

Major Tryon said that the Southampton experiment, which would include local distribution of broadcast programmes both over special wires and over the telephone wires, did not in any way commit the Government to accepting the recommendations of the Ullswater Committee with reference to relay services. Its object was to obtain more information before coming to a decision.

Mr. Craven-Ellis asked the Postmaster-General whether he would accept full responsibility for the contents of the foreign radio programmes supplied to subscribers through the medium of the proposed service at Southampton; and what steps would he take to exclude foreign propaganda from such programmes.

Major Tryon said that in accordance with the recommendations of the Ullswater Committee it was the intention that the B.B.C. should be responsible for the choice of programmes to be relayed to the subscribers to the service at Southampton. He had no doubt that the Corporation would take what steps were necessary to exclude from the service any foreign programmes containing propaganda.

The Brixham Bill

The Brixham Gas and Electricity Bill was read a second time in the House of Commons on February 7th.

The Distribution Bill

Our reporter says that he is authoritatively informed that it is very unlikely that the proposed Electricity Distribution Bill will be introduced this session; it will certainly not reach the Statute Book. The presentation of the measure will probably be deferred until the new session which commences in the autumn.

Electricity Supply

Lighting, Domestic, Power

Accrington.—STREET LIGHTING.—In view of the Corporation's commitments in connection with side-street lighting and the numerous experiments that are being carried out with modern systems of lighting throughout the country, the preparation of a complete main-road lighting scheme has been deferred for twelve months. In the meantime the lighting superintendent is to prepare a scheme for the improvement of certain portions of the existing main-road lighting and a sub-committee is to visit neighbouring towns where experiments with modern types of lighting are being carried out.

Barrow-in-Furness.—EXTENSIONS.—Mains extensions are to be carried out at Hawkshead at an estimated cost of £7,850, and £20,948 is to be spent on other mains extensions.

Bedford.—EXTENSIONS.—The Electricity Committee is to extend mains to South Ampthill at a cost of £323, to the Girls' Modern School (£259), to the London Road housing estate (£1,537), and to the works of the Marston Valley Brick Co. (£845). It is seeking sanction to borrow £3,000 for wiring and £7,500 for the rural development scheme.

LOAN.—The Committee has obtained sanction to borrow £15,000 for unspecified works.

Blackpool.—HOSPITALS' SUPPLIES.—A flat rate of 1d. per kWh has been approved by the Electricity Committee for supplies to the Victoria and Infectious Diseases Hospitals.

BETTER LIGHTING.—The Highway Committee has asked the electrical engineer to prepare a comprehensive scheme for the improved lighting of the promenade between Gynn Square and Norbreck Hydro.

Boston.—RURAL DEVELOPMENTS.—The Boston and District Electric Supply Co., Ltd., is engaged on a scheme for supplying electricity to Kirton End, Kirton Holme, Fen Houses, Hubbert's Bridge and Leake Common Side.

Bradford.—ELECTRICITY PREFERRED FOR SCHOOL LIGHTING.—The Education Committee has placed on record the opinion that, in general, electricity is preferable to gas for school lighting, and has instructed the director to prepare a three-years' programme for the installation of electric lighting in schools where the lighting is by gas and is not satisfactory.

Brierley Hill.—SUPPLY EXTENSION.—The Midland Electric Corporation for Power Distribution, Ltd., proposes to afford a supply of electricity to Council houses on the Saltwells estate at Quarry Bank.

Camborne-Redruth.—ELECTRICITY TO REPLACE GAS.—The Lighting Committee's recommendation that electric lighting should be used in Redruth streets instead of gas has been adopted.

Cardiff.—HIRE TERMS.—The Electricity Committee has fixed the following terms for the hire of water-heaters and wash-boilers: Circulator-type thermostatically controlled water-heaters, 4s. per quarter (non-reducing charge), including 60 ft. of wiring; ten-gallon wash-boilers, 2s. per quarter where wiring is not required and 3s. per quarter with wiring up to 60 ft. The minimum period of hire in each case is one year.

Colchester.—OVERHEAD LINES.—Extra transmission capacity is to be provided to the coastal estates between Clacton and Brightlingsea by the Colchester Town Council. This is to be done by re-stringing the existing line with 0.10 sq. in. conductors and by continuing the extra-high-voltage line across Brightlingsea Creek and back again to the Walton main line, and so provide a local ring feed. The estimated cost of the scheme is £4,070.

Deal.—DECORATIVE LIGHTING.—Extensions are to be carried out to the decorative lighting by the Town Council at a cost of £247.

Dereham.—LIGHTING.—The Council is to give early consideration to lighting the trunk road A47, for which the electricity manager is preparing a scheme.

Dorchester.—EXTENSIONS.—The question of affording a supply to Kingston Russell is being considered by the Wessex Electricity Co. with a view to this parish being included in the company's proposed extensions to Litton Cheney.

Dumfriesshire.—FRINGE ORDER.—The County Council has obtained a Fringe Order for an electricity supply to the Ministry of Labour industrial centre at Kershopefoot.

Eastbourne.—CINEMA LIGHTING.—The Winter Garden Committee is to provide secondary lighting at the Winter Garden Cinema at a cost of £370.

CHEAPER STREET LIGHTING.—The charge for street lighting has been reduced from 1¼d. to 1¼d. per kWh.

East Ham.—WATER-HEATER HIRE CHARGES.—A reduction in the hire charge for thermostatically controlled water-heaters from 3s. 6d. to 1s. 6d. per quarter is to be made by the Electricity Committee.

POWER POINTS.—Heating points, in the proportion of one heating to three lighting points (with a maximum of two heating points), will be allowed to rental consumers by the Electricity Department where they are agreeable to be charged on the "all-in" tariff. The rental charge is to be the same as for lighting points, subject to a small initial charge towards the additional cost of the switch plug required. Two heating points and a radiator will be supplied on hire-purchase for 5s. with order, plus eighteen quarterly payments of 5s. 6d.

Fleetwood.—LIGHTING AT KNOTT END.—A scheme has been completed for the improvement of public lighting at Knott End (near Fleetwood) and Preesall. The new lighting is by sodium lamps.

Freebridge (Norfolk).—SUPPLY TO GRIMSTON.—Owing to the cost making underground cables impracticable, the Rural District Council has approved the East Anglian Electricity Supply Co.'s scheme to supply Grimston by overhead lines.

Great Yarmouth.—HOSPITAL WIRING.—The Health Committee is to renew the wiring system at the hospital at an estimated cost of £579.

BETTER LIGHTING.—Approval has been given to a scheme submitted by the electrical engineer for better lighting in secondary roads in the borough at a cost of £13,193.

Grimsby.—EXTENSIONS.—At a recent meeting of the Electricity and Public Lighting Committee the borough electrical engineer, Mr. S. R. Windle, reported that the foundation and other works required for the installation of the new 15,000 kW turbo-generator and steam raising and cooling plant were now well advanced.

Hazel Grove.—AUTOMATIC VOLTAGE CONTROL.—A comprehensive report is to be prepared by the electrical engineer on the question of the installation of automatic voltage control equipment. The Electricity Committee has decided to replace the 250-kVA transformer at Fir Grove sub-station by one of 500 kVA and to transfer the old transformer to a new sub-station.

Hildenborough.—STREET-LIGHTING POLL.—Voting took place recently on a proposal to adopt the Lighting and Watching Act of 1883 for the purpose of street lighting. Although 498 voted for and only 85 against the proposal, it was defeated as there was not a clear majority of the whole number of electors.

Horsham.—RURAL SUPPLY.—A supply of electricity is to be afforded by the Electricity Department to Colgate, Roffey, Southwater and Warnham at an estimated cost of £1,860.

Hove.—MAINS AND SERVICES.—The Electricity Committee is seeking sanction to borrow £21,000 for mains and services.

CHANGE-OVER.—At a cost of £8,470 the Committee is to effect a change-over from d.c. to a.c. and erect a sub-station in the recreation ground.

Inverness.—RURAL SUPPLIES.—Rural communities in Lochaber, hitherto dependent on paraffin lamps for light, will have the opportunity of using electricity if the Caledonian Power Scheme goes through. Places to which the Lochaber District Committee of the Inverness County Council recommends that supplies should be made available are Glenelg, Mallaig, Arisaig, Morar, Mingary, Onich, North Ballachulish, Achdaleiu, Kinlochiel, Roybridge, Speanbridge and Gairlochy.

Ipswich.—SUB-STATIONS.—The Electricity Committee is applying for permission to borrow £15,000 for sub-stations and equipment.

Lanarkshire.—SUPPLY AREA APPLICATION.—The attention of the Hamilton Electricity Committee has been directed by the Town Clerk to an application by the Lanarkshire County Council for powers to supply electricity. The Committee has agreed that steps shall be taken to oppose the County Council's application in so far as the portion of the county recently added to the burgh by the Hamilton Order of 1937 is concerned.

EXTENSIONS.—Wilsontown and Braehead are to be supplied with electricity, according to a decision reached by the County Council and the Clyde Valley Electrical Power Co. The estimated cost of the extension is £4,815, and the Clyde Valley Co. stipulates that 20 per cent. of this amount must be returned each year for five years. The estimated revenue is £465 per annum, and the County Council has agreed to make it up to £506.

COMPENSATING COUNCIL HOUSE TENANTS.—The question of compensation for Council house tenants who install electricity at their own expense has again arisen, this time in Lanarkshire, where the Central Council of Tenants' Associations has decided to write to the County Council asking that compensation shall be paid in all cases. It will be recalled that the Lochgelly Town Council approved a similar claim made some time ago by tenants of municipal houses in the burgh, and decided to pay compensation subject to a ruling from the Secretary of State for Scotland as to the legality of such an action. The position has not yet been determined.

Lichfield.—EXTENSION.—Mains are to be extended by the Electricity Committee to Shire Oaks at a cost of £1,076.

COMMERCIAL COOKING TARIFF.—The Electricity Committee recommends the following prices for electricity consumed for commercial cooking: Up to 5,000 kWh per quarter, 1d. per kWh; second 5,000 kWh at ¾d.; and all over 10,000 kWh per quarter at ½d.

London.—SCHOOL LIGHTING.—The County Council is to install electric lighting at the Merton Road School, Putney.

FULHAM.—The Works Committee has been informed that the Electricity Department cannot make use of surplus steam from the destructor and does not require the present destructor site for the purposes of the generating station. It is proposed that the steam shall be utilised for operating a new

electrical generating set to supply the electricity now taken from the power station. The installation of a new four-cell incinerator unit and a dust collection plant is also recommended.

FIRE ALARM SYSTEM.—At a cost of £90,000 the L.C.C. Fire Brigade Committee is to extend the closed-circuit fire alarm system throughout the Metropolis. The old system, which was first adopted in London in 1880, is rented from the Post Office, but the new system will be owned by the Council. The Committee is also to install new speech-amplifying equipment at the headquarters at a cost of £200.

PUMPING MACHINERY.—The County Council has approved a revised scheme for new pumping machinery at the southern outfall works at a cost of £47,000.

Longfield (Kent).—REQUEST FOR A SUPPLY.—Tenants in the Dartford rural district are to petition the Ministry of Health for a supply of electricity.

Lowestoft.—CHANGE-OVER.—The Electricity Committee is seeking sanction to a loan of £24,250 in connection with the change-over of the system. It has already obtained permission to borrow £2,340 for the alteration of the system of supply in the Kirkley Gardens and Laurel Road areas.

Manchester.—A LARGE LOAN.—Powers are being sought by the Electricity Committee to borrow £200,000 for service mains.

STREET LIGHTING.—The current sanction for street-lighting purposes being on the eve of exhaustion, it is proposed to apply to the Ministry of Health for an amount of £20,000 under the usual debt redemption period of twenty-five years.

Middlesbrough.—REVISED TARIFFS.—Concessions which will benefit consumers inside the borough to the extent of £7,600 per annum and those outside by £291 have been approved by the Electricity Committee.

Middlesex.—SUB-STATIONS.—Owing to a transposition of type a note in our last issue referring to a decision to apply for sanction to a loan of £10,000 for sub-station buildings appeared under "Middlesex" instead of "Leeds."

Morley.—LOANS.—Applications are to be made for sanction to loans of £17,000 for an extension of the three-phase system, £10,000 for mains and services and £5,000 for the change-over, Mr. N. Hunter, the borough electrical engineer, informs us.

Nantwich.—ELECTRICITY FOR COUNCIL HOUSES.—The Rural District Council is to have electricity installed in forty Council houses.

Newark.—INCREASED DEMAND.—The Electricity Committee is to give six months' notice to the Derbyshire and Nottinghamshire Electric Power Co. requiring the permitted maximum demand to be increased from 3,500 to 4,000 kW.

Newburn-on-Tyne.—ELECTRICITY IN COUNCIL HOUSES.—Consideration of a proposal that existing Council houses should be provided with electricity for lighting has been deferred, but other houses to be erected at Westerhope, subject to the approval of the Ministry of Health, will be wired for electricity.

Norton.—RURAL SUPPLIES.—The Electricity Commissioners have given permission for the York Corporation to supply electricity to certain premises in the parish of Howsham, and the Rural District Council is to inquire whether the Corporation is prepared to supply additional parishes in the area, particularly Langton and Westow.

Norwich.—SWITCHGEAR.—The Electricity Committee is to increase the size of the switchgear annexe at a cost of £3,165.

Oldham.—NEW EQUIPMENT.—The Town Council has received sanction to borrow £40,300 for feeders and switchgear.

Oxford.—PETITION FOR MUNICIPAL SUPPLY.—A petition is being prepared by residents in North Hinksey for the area to be included in that of the Corporation's electricity undertaking.

Peterborough.—METERS.—Application is to be made by the Electricity Committee for permission to borrow a further £5,000 for the purchase of supply meters.

Plympton St. Mary.—RURAL EXTENSION.—Mains are to be extended by the Rural District Council to Hemerdon, Lee Moor and Sparkwell at a cost of £4,506.

Rotherham.—HIRE OF COOKERS.—The following safeguards have been recommended by the Electricity Committee in connection with the hiring out of cookers: A cooker is not to be let out on simple hire to a person who wishes to discard an existing cooker or who has discarded such a cooker on the grounds that the Gas Department is not willing to hire out a different model, until a period of three months has elapsed from the termination of the Gas Department's contract. In the case of a person taking over the tenancy of a house in which a gas cooker has been left by the outgoing tenant the Electricity Department is not to supply a cooker on simple hire without first having given the Gas Department an opportunity of trying to persuade the incoming tenant to continue to use gas. The Gas Department is to be allowed seven days in which to act, and is to notify the Electricity Department of its success or otherwise within this period.

Salford.—TWO-PART TARIFF REDUCED.—The "all-in" domestic rate is to be reduced from ¾d. to ½d. per kWh for the first 200 kWh per quarter, and from ½d. to ¼d. per kWh for all over 400 kWh in each of the two summer quarters.

Scarborough.—METER TESTING.—The Electricity Committee is to provide meter-testing equipment at an estimated cost of £1,223.

Stockport.—POWER STATION EXTENSIONS.—The Finance Committee has approved the Electricity Committee's application for sanction to borrow £453,154 for the extension of the Millgate generating station.

Stockton-on-Tees.—The borough electrical engineer has prepared plans for an electrical testing station to cost £3,850, with £900 for equipment.

Stoke-on-Trent.—ELECTRICITY AND COUNCIL HOUSES.—Having regard to the cost involved, the Housing Committee is unable to accede to the request that all existing Corporation houses should be wired for power.

DISTRIBUTION DEVELOPMENTS.—An extra-high-voltage feeder is to be provided by the Electricity Committee from the Stoke generating station to Bucknall sub-station to give an additional supply to Bucknall and adjoining areas at a cost of £4,000. A sub-station is to be provided at Rectory Street, Shelton, at a cost of £5,000, and improvements are to be made in the supply in Leek Road, Hanley (£900), and Packmoor and Bemersley Green (£5,950).

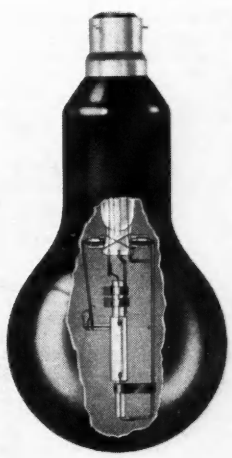
Swansea.—TIR JOHN POWER STATION.—The allegations and rumours concerning the operations at Tir John reached another stage when a special meeting of the Borough Council was held in camera for nearly three hours last week, receiving and considering the views of the Central Electricity Board. It was officially disclosed at the end of the meeting that a deputation from the Electricity Committee that recently went to London had a conference with the general manager and chief engineer of the C.E.B. and the Town Clerk reported fully on the conversations that then took place. After a long discussion the Council decided to engage a practical combustion engineer to investigate and report fully on the operation of the boilers and plant.

Approval has been given to the expenditure of £9,042 for new switchgear at the Tir John power station.

Thornley (Co. Durham).—ELECTRIC-DISCHARGE LIGHTING.—During the summer the 60-W street lamps are to be replaced by 400-W electric-discharge lamps. The positions of 80-W discharge lamps to be erected on the Gore Hall estate have been approved.

New Ultra-violet Ray Lamp

A CONVENIENT source of ultra-violet light for non-medical uses has become available. The Philips "black bulb" lamps of 80 and 125 W were announced in December and others are being produced by the G.E.C., B.T.H., Siemens and Metro-Vick. concerns. The "Mazda" pattern is similar internally to the 125-W "Mercra" mercury-discharge lamp. The transparent quartz tube which withstands the high temperature is enclosed within a bulb of conventional shape, but is made of a special filter glass. This almost completely stops the emission of visible light, yet releases the ultra-violet rays. About 95.5 per cent. of the radiation is said to be at 3,650 Au, so that it has no sun-burning or therapeutic properties.



The new B.T.H. mercury-vapour u.v. lamp

This lamp is for a.c. circuits only; one of the two activated electrodes is associated with an auxiliary electrode to ensure reliable starting at from 220 to 250 V, a step-up transformer being needed for lower voltages. A correctly designed series choke is necessary, the bayonet cap being provided with a third pin for this purpose. A condenser may be added to improve the power factor.

The new lamp is of the same size as the ordinary 200-W filament type, so that it can be used with normal fittings and reflectors, though aluminium is the most satisfactory reflecting surface for u-v rays. It can be used at any angle and the integral filter bulb enables the radiation to be utilised in all directions round the bulb.

For instance, the National Marking Machine Co., Ltd., makers of laundry identification equipment, has devised apparatus for impressing the usual laundry marks on linen in indelible fluorescent ink, which is quite invisible in ordinary light but shows up boldly under a "Mercra" u-v filter lamp, thus easing the packer's task of sorting garments.

Other applications of ultra-violet light are to the examination of foodstuffs and chemical products; stains on textile fabrics can be made visible and normally colourless substances can be made to fluoresce, thus indicating possibilities in decorative lighting and for advertising purposes.

Uttoxeter.—SUPPLY TO KINGSTONE.—Approval has been given by the Urban District Council to a recommendation of the Electricity Committee that steps shall be taken to provide a supply of electricity for the village of Kingstone.

Wallasey.—ELECTRICITY CHEAPER.—Reductions in the price of electricity have been approved by the Electricity Committee as follows: 3d. to 2¼d. per kWh, less 5 per cent. discount for prompt payment; ¼d. per kWh throughout the year under the two-part tariff for domestic supplies instead of ½d. during the summer and ¼d. during the winter. These reductions represent a concession of approximately £10,000 in a year.

Walsall.—DEVELOPMENTS.—The Electricity Committee has adopted a programme of new construction and improvements at a cost of £25,170.

Wellingborough.—STREET LIGHTING.—General improvements to street lighting are under consideration by the Urban District Council, and provision is to be made in the annual estimates for probable expenditure. A scheme to light the Burton Latimer-Irthlingborough road at Finedon for a distance of 1½ miles is also under consideration.

Wick.—LOAN.—The Town Council has decided to borrow £500 for the purchase of additional meters.

Wolverhampton.—INCREASED SUPPLIES.—An alternative high-voltage supply is to be given to H. M. Hobson (Aircraft & Motors), Ltd., at an estimated cost of £814. It is also proposed to erect an additional transforming centre near York Avenue to meet the growth of load (£1,081), and a new sub-station at Bilbrook (£1,645). In connection with the supply to the Walsall Street works of the Ever Ready Co. (Great Britain), Ltd., at extra high voltage instead of low voltage as hitherto, the necessary cable and metering equipment is to be provided by the Electricity Committee at a cost of £231. Mains are to be extended to the Finchfield Farm estate (£1,322) and to the Woodlands estate, Penn (£547).

The Electricity Committee is seeking sanction to borrow £100,000 for electric cookers, water heaters, etc.

Traction

Darlington.—TROLLEY-BUSES.—Consideration is being given by the Transport Committee to the extension of the trolley-bus service along Yarm Road, where building developments are taking place.

Gateshead.—OPPOSITION TO TRANSPORT BILL.—The North-Eastern Electric Supply Co., Ltd., is to oppose the Gateshead and District Tramways and Trolley Vehicles Bill which is being promoted by the Gateshead & District Tramways Co., with the object of replacing the present tram services by trolley-buses. The Felling-on-Tyne Urban District Council is also opposing the tramway company's Bill and is supporting that promoted by the Gateshead Corporation to empower it to take over the company's tramways and replace them by trolley-buses.

London.—MINISTER OF TRANSPORT FAVOURS TROLLEY-BUSES.—Speaking at a luncheon of the Coal Industry Society in London on Monday, the Minister of Transport said that, apart from those cities which were so "tram-minded" that to take tramcars from them would be an insult (Edinburgh and Glasgow), it would be better if tramcars were progressively removed. The place of the tramcar should be taken by the trolley-bus, using an equivalent output of electricity generated by an equivalent expenditure in coal.

Newcastle-on-Tyne.—RAILWAY ELECTRIFICATION.—The electrification of the railway between Newcastle and South Shields, a distance of nine miles, has been completed, and electric trains are expected to be put in operation early in May. At the outset both electric and steam services will be run, but the steam trains will be gradually eliminated as electric rolling stock becomes available. The work of conversion has cost about £500,000. The travelling time between the two towns will be reduced from 34 to 27 minutes.

Portsmouth.—FINANCIAL SITUATION.—The City Council is to discuss a report on the financial position of the passenger transport undertaking. It will be necessary to lay down a definite policy as to the future of the undertaking, and the Council will have to decide whether the undertaking is to be run at a reasonable profit for the general good of the city; to be commercially self supporting; or to be run for the convenience of the public, visitors, &c., any loss to be borne by the rates.

Southern Railway.—WITHDRAWAL OF HASTINGS ELECTRIFICATION SCHEME.—Among the works which the company decided to carry out under the Railways (Agreement) Act, 1935, was the electrification of the line from Sevenoaks to Hastings and Bexhill. Last week, however, a deputation consisting of the Mayor of Hastings, the Mayor and Deputy Mayor of Bexhill, and the Town Clerks of both towns was informed by the company that it did not propose to proceed with the scheme at present. This particular electrification, it was stated, had always appeared the least financially attractive of those projected, owing to the restricted load gauge necessitating special new electrical rolling stock of different dimensions to that used elsewhere on the system (this being already the case with the steam trains now running), and to the existence of an alternative electrified route, which would, as has now been proved to be the case, divert many passengers who once travelled by the direct route. Electrification of the line would probably bring them back without necessarily increasing the net revenue from traffic by both routes. Since the Act of 1935 conditions had altered considerably by the diminution of unemployment. The cost of material and labour had risen and continued to rise, and the economic aspect of certain of the company's schemes in the schedule, and more especially that affecting Hastings, had very much changed. There were also other factors of a technical nature which weighted the scales against the scheme.

South Shields.—TROLLEY-BUSES.—With the exception of that from Moon Street to Cleadon all the Corporation tram routes are expected to be converted to trolley-bus working by April. By July trolley-buses are to be inaugurated also from Ocean Road along the Coast Road to Marsden, a route not served by trams.

United States.—TROLLEY-COACHES.—The trolley-coach has become an essential urban transport vehicle—one which is creating standards in city travel far above expectations—states Mr. W. J. Clardy (Westinghouse Electric & Manufacturing Co.) in *Mass Transportation*. Since the advent of the modern version of this vehicle in Salt Lake City in 1928 it has been utilised in thirty-eight cities ranging in population from 29,000 to 7,000,000. The number of vehicles was 300 in 1933 and has now passed the 1,300 mark. An interesting development, initiated in 1935, is the so-called "all-service" vehicle which contains a petrol engine driven generator for use on routes where there is no overhead equipment. More than 450 of these are in operation on the lines of the Public Service Co-ordinated Transport system in New Jersey. The total number of trolley-coaches and all-service vehicles in the United States and possessions at the end of 1937 reached 1,776. The outlook for the trolley-coach is bright. Mr. Clardy believes that the number operated may be expected to reach 20,000.

The City Railway Co., Dayton, Ohio, after extensive study of trolley-coach operation both in Dayton and in the eastern part of the United States, recently placed an order for nine vehicles with the two-motor control and equipment.

Communications

Great Britain.—RADIO LICENCES.—The total number of radio receiving licences in force at the end of January was 8,536,800, as compared with 8,067,200 a year ago.

RADIO-TELEPHONY.—It has been reported to the Lerwick Town Council that an agreement has been concluded with the Post Office regarding radio-telephone communication between the Shetland Islands and the mainland. The P.O. guarantees to take 80,000 kWh per annum from the Town Council.

India.—TELEPHONE AND TELEGRAPH DEVELOPMENTS.—The next Government Budget will include provision for quicker and more extended telephone and telegraph communication between many important centres in India. There will be three additional telephone and four telegraph carrier channels between Calcutta and Delhi, and other new carrier channels between Bombay and Karachi, and Bombay and Ahmedabad. The Lahore and Delhi telephone exchanges will be strengthened to meet the increasing demand. Three new telephone exchanges will be opened in the Punjab, and new trunk lines will be established between various places.

RURAL BROADCASTING.—It has been decided to make special provision in the next Budget for expenditure in connection with a three-year plan of rural broadcasting, which will be started in the first instance in Delhi Province. This province will be divided into five zones for the purpose of the scheme, each with twenty-five rural broadcast sets. Each zone will be in charge of a supervisor, who will look after the sets and be responsible for recharging the batteries. The villages chosen will have at least 600 inhabitants each. The sets to be used for the scheme have been specially designed by All-India Radio and incorporate time switches.

BOMBAY'S NEW SHORT-WAVE STATION.—The new 10-kW short-wave station of All-India Radio was inaugurated in Bombay on February 4th by the Governor of Bombay. The new station marks a considerable step forward in the broadcasting service of the Presidency. The small medium-wave transmitter established ten years ago could not serve much more than Bombay City, except during the winter months when exceptionally good conditions for broadcasting prevail in India. The new short-wave transmitter serves all parts of the Presidency throughout the year. In a broadcast speech the Governor said he hoped that this new development would lead to a much greater use of broadcasting in Bombay. In India there was one broadcasting licence for approximately every 10,000 of the population. Bombay Presidency was ahead of other provinces, with one licence for every 1,000, and in Bombay City there was one licence for every 100, but even the last figure was small compared with the position in Western countries.

Sweden.—TELEPHONY.—The number of telephones increased during 1937 by 53,000 to 740,000 according to statistics just published by the Swedish Telephone and Telegraph Department. The number of subscribers per 100 inhabitants has increased from 11 at the end of 1936 to 11.8 at the close of last year. Through this increase Sweden has advanced from the second to the first place among the European countries as regards the number of telephones per capita, and in the world statistics Sweden now ranks as second only to the U.S.A. (14.3 telephones per 100 inhabitants).

Turkey.—STATE TELEPHONE EXCHANGES.—The Turkish Government has decided to acquire the telephone system of the Société des Téléphones de Smyrne.

Contract Information

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses

Contracts Open

Aberdare.—March 14th. Electricity and Transport Department. Apparatus and equipment for the establishment of a "Class A" meter-testing station. (See this issue.)

Alnwick.—R.D.C. Electrical work in forty houses at Felton and thirty at Lesbury. Hetherington and Wilson, architects, County Chambers, Westgate Road, Newcastle-on-Tyne.

Australia.—BRISBANE.—March 30th. City Electric Light Co., Ltd. One electric goods lift. (T.Y. 17341/38.)*
MELBOURNE.—June 29th. Victorian Railway Commissioners. Turbo-alternator and accessories. (T.Y. 17013/38.)*

Aylesbury.—March 1st. Electricity Department. Materials for twelve months. (February 11th.)

Barry.—February 19th. U.D.C. Electric bells, lamps and conduits for twelve months. E. R. Hinchsliff, surveyor, Council Offices.

Bingley.—March 8th. Electricity Department. Mercury discharge lamps. (See this issue.)

Birmingham.—March 11th. Airport Committee. Installation of electric lighting and power wiring at Municipal Airport Buildings. (See this issue.)

Blackburn.—February 28th. Electricity Committee. Cable, wire and meters for twelve months. (February 4th.)

Bristol.—March 4th. Port Authority. Two 1½-ton electric travelling portal cranes for Fry's Wharf, Canon's Marsh. Secretary, 19, Queen Square (deposit £3).
March 8th. Electricity Department. Joint and fuse boxes, and cables for twelve months. (See this issue.)
February 22nd. Electricity Department. Six superheaters for Portishead generating station. A. J. Newman, chief engineer, Electricity Department, Colston Avenue.

Bromley.—March 9th. Electricity Department. L.v., e.h.v., and l.v. pilot cables, and a.c. meters. (See this issue.)

Buckhaven and Methil (FIFE).—February 23rd. Town Council. Electrical installations in 262 houses. Town Clerk, Municipal Buildings (deposit £1 1s.).

Cleethorpes.—March 5th. Electricity Department. Two 250-kVA transformers. (See this issue.)

Derby.—March 1st. County Council. Cables, lamps and electrical accessories for twelve months. (February 11th.)

Dover.—March 4th. Corporation. Meters, transformers and cables for twelve months. (See this issue.)

Dumfries.—March 1st. Town Council. Electrical installations in six houses at Church Street. Town Clerk.
March 5th. Dumfries and Galloway Royal Infirmary. Electrical installation at auxiliary hospital. J. A. Will, secretary and treasurer, 3, Great King Street.

Egypt.—CAIRO.—March 2nd. Ministry of Public Works (Mechanical and Electrical Department). Two aircraft warning light installations. (T.Y. 17043/38.)*

Erith.—February 28th. Electricity Department. Meter testing equipment. (February 4th.)
March 7th. Electric water-heaters. (February 11th.)

Felixstowe.—February 21st. Electricity Department. Two 250-kVA transformers (6,000/415/240 V). (February 4th.)

Fife.—February 28th. County Council. Electric lighting installations in forty-eight houses on the Hallbeath estate. County Clerk, County Buildings, Cupar (deposit £1 1s.).

Finchley.—February 28th. Electricity Department. Stores for twelve months. One five-ton cable-drum carrying trailer. (February 11th.)

Gosforth.—U.D.C. Electrical wiring at 132 houses on the Coxlodge estate. C. Wyld, surveyor, Council Offices.

Greenock.—Corporation. Electric lighting installation in 390 houses at Upper Bow Farm. Director of housing, Municipal Buildings.

Hamilton.—February 22nd. Town Council. Transformers, switchgear and cables for two sub-stations. (See this issue.)
Electricity Department. E.h.v. and l.v. cables. (See this issue.)

Harrogate.—February 21st. Corporation. Electric lamps for twelve months. L. H. Clarke, borough engineer, Municipal Offices.

Hazel Grove and Bramhall (CHESHIRE).—March 3rd. Electricity Department. One 500-kVA transformer. (February 11th.)

Heston and Isleworth.—February 23rd. Electricity Department. One 3-phase transformer and e.h.v. switchgear. (February 11th.)

Honley.—February 21st. Electricity Department. One 1,500-kVA transformer, e.h.v. cable, and conversion of two 400-kVA transformers to automatic voltage regulation. (February 11th.)

Huddersfield.—February 23rd. Corporation. Installation of electric plugs in 1,417 Corporation houses. Town Clerk, Town Hall.
February 23rd. Installation of electric lighting in seventeen houses at Crow Lane Terrace, Milnsbridge. Town Clerk, Town Hall.

Ilford.—March 5th. Electricity Department. E.h.v. switchgear. (See this issue.)

India.—NEW DELHI.—March 4th. Indian Stores Department. Table standards, wires, shades, lampholders, lamp locks, &c., for one year. (T. 16825/38.)*
April 26th. Wall plugs and sockets, ceiling roses, &c. (T.Y. 16826/38.)*
BENGAL.—March 15th. Bengal and North Western Railway Co., Ltd. 26,300 tungsten filament lamps. (See this issue.)

Kettering.—February 25th. Electricity Department. Cables and meters for one year. (February 4th.)

Littleborough.—February 26th. Electricity Department. Cables and meters for twelve months. (February 11th.)

Leyton.—March 7th. Electricity Department. Cables for twelve months. (See this issue.)

London.—HAMMERSMITH.—February 23rd. Electricity Department. Switchgear and transformers. (February 4th.)
ISLINGTON.—March 2nd. Borough Council. Exhaust pipes. (February 11th.)
POPLAR.—March 9th. Borough Council. Stores for twelve months. (February 11th.)
STEPNEY.—February 28th. Cables for twelve months. (February 11th.)

Lossiemouth.—February 26th. Town Council. Electrical installations in twenty-two houses at Coulardhill. Town clerk.

Manchester.—March 16th. Corporation Airport Committee. Installation of aerodrome lighting, including equipment, switchgear and cables. (February 11th.)
March 1st. Electricity Department. Ventilating plant for transformer chambers. (See this issue.)

Middlesex.—February 28th. County Council. Electrical sundries for twelve months and X-ray, &c., requisites for six months.
March 21st. Electrical installation at new County School for Boys, Isleworth. (See this issue.)

Milford Haven.—February 24th. Electricity Department. Two 100-kVA transformers, one 25-kVA pole mounting transformer, l.v. cable and l.v. switchgear. (February 11th.)

New Zealand.—WELLINGTON.—March 10th. Posts and Telegraph Department. One motor generator set. (T. 17071/38.)*
April 6th. One electric cross-cut saw. (T.Y. 17265/38.)*

Northern Ireland.—BELFAST.—February 25th. One 6.6-kV skeleton bus-bar section panel and trunking, fire extinguishing equipments, a.c. motors, and wiring to replace existing d.c. installation. (February 11th.)

Perth.—February 21st. Corporation. Two sets of glass-bulb mercury rectifiers, complete with switchgear, transformers and automatic control gear. (February 4th.)

Portland.—March 14th. Electricity Department. Stores for twelve months. (See this issue.)

Rhondda.—March 26th. Electricity Department. Materials for twelve months. (See this issue.)

Rhyl.—March 1st. Electricity Department. Materials for twelve months. (See this issue.)

Salford.—February 23rd. Electricity Department. Cookers, fires, water heaters, wash boilers, kettles, switches and fuse boxes. (February 4th.)
February 22nd. One oil circuit-breaker. (February 11th.)

South Africa.—PRETORIA.—March 3rd. Union Tender and Supplies Board. One Diesel engine, two alternators, three switchgear panels, three transformers, one a.c. motor, cable and cable end boxes. (T.Y. 17428/38.)*
March 3rd. One 7½-kW, 110-V, Diesel-engine driven electric lighting plant, complete with switchboard and battery. (T. 17612/38.)*
March 17th. Three oil-engine driven generator sets. (T.Y. 17596/38.)*
JOHANNESBURG.—March 19th. City Council. L.v. cable end boxes. (T. 17427/38.)*

Stoke-on-Trent.—March 9th. Electrical Engineer's Department. Mains and cables and e.h.v. sub-station switchgear for one year. (February 11th.)

Sutherland.—March 5th. County Council. Electric lighting at a new school at Golspie. County Clerk, Golspie.

Warrington.—March 8th. Visiting Committee. Heating and electrical installation and kitchen equipment for County Mental Hospital, Winwick. (February 4th.)
March 7th. Electricity Department. Meter-testing equipment. (See this issue.)

West Ham.—February 28th. Town Council. Installation of traffic lights at various junctions in Barking Road, Canning Town. W. L. Jenkins, borough engineer, Town Hall (deposit £1).

West Hartlepool.—March 7th. Electricity Department. Pilot and telephone cable. (See this issue.)

Windsor.—February 28th. Borough Council. Electric lighting installations in 32 houses being erected at Dedworth. F. N. McRae, borough engineer, 16, Alma Road.

Wolverhampton.—February 23rd. Borough Council. Switchgear for twelve months. (February 11th.)

Worcester.—February 26th. Electricity Department. Cables, conductors, transformers and meters for twelve months. (February 4th.)

Workington.—March 7th. Electricity Supply Department. Meter-testing instruments. (See this issue.)

* Further particulars from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Contracts Closed

Barrow-in-Furness.—Electricity Committee. Accepted. Two kiosks (£822).—Met.-Vick. Electrical Co.

Bedford.—Electricity Committee. Accepted. Two transformer kiosks (£763).—Crompton Parkinson.

Blackpool.—General Purposes Committee. Accepted. Electric lifts at municipal offices.—Evans Lifts.
Electricity Committee. Accepted. Switchgear.—Switchgear & Cowans.

Bootle.—Watch Committee. Recommended. Installation of sodium lighting in Marsh Lane (£400).—Revo Electric Co.

Bridgnorth.—Town Council. Accepted. Electrical borehole and pumping machinery (£3,086).—Pulsometer Engineering Co.

Brookwood.—Surrey County Council. Accepted. Complete electric lighting, power, fire alarm, clocks, radio and bell installations, also armoured service cables, with main switch panels, sub-gear and auxiliary services at the new hospital. —C. F. Williams.

Cheltenham.—Electricity Committee. Accepted. Meter, testing equipment (£394).—Met.-Vick. Electrical Co.

Cheshire.—County Highways Committee. Accepted. Traffic signals at Oakmere Road (£528).—Automatic Telephone & Electric Co.

Gt. Yarmouth.—Education Committee. Recommended. Electrical installation at North Denes School (£323).—Lowestoft Electrical Co.

Hastings.—Pavilion Committee. Accepted. Electric wash boiler and other kitchen plant (£574).—Still & Sons.

London.—FULHAM.—Works and Highways Committee. Recommended. Conversion of traffic signals at junction of North End Road and Lillie Road to the vehicle-actuated type (£900).—Siemens & General Electric Railway Signal Co.
Electricity Committee. Recommended. Chlorination plant (£305).—Paterson Engineering Co.

Lowestoft.—Electricity Committee. Recommended. Cable (£508).—Crompton Parkinson. Switchgear (£955).—A. Reyrolle & Co. Rectifiers (£624).—Electric Construction Co.

Margate.—Education Committee. Accepted. Improving the electric lighting installation at Lausanne Central School (£42). —E. Saunders (Margate).

Sleaford.—Electricity Committee. Accepted. Single-phase meters.—Aron Electricity Meter Co.

Swansea.—Electricity Committee. Accepted. Switchgear for the supply to the Magnesium Metal Corporation (£9,042).—Ferguson, Pailin.

Wolverhampton.—Water Committee. Recommended. Duplicated pumping plant at Cosford Waterworks (£24,413).—W. H. Allen & Sons.

Forthcoming Events

Institution of Electrical Engineers.—Thursday, February 24th. Institution, London, W.C.2. 6 p.m. "The Electrical Ignition of Mixtures of Ether Vapour, Air, and Oxygen." Prof. W. M. Thornton. "The Risk of Explosion due to Electrification in Operating Theatres of Hospitals." Mr. E. H. Rayner.

Scottish Centre.—Tuesday, February 22nd. North British Station Hotel, Edinburgh. 7 p.m. "Rural Electrification." Mr. J. S. Pickles.

Mersey and North Wales (Liverpool) Centre.—Tuesday, February 22nd. Technical Institute, Chester. 7.30 p.m. "Line Protection by Petersen Coils." Messrs. H. Willott Taylor and P. F. Stritzl.

West Wales (Swansea) Sub-Centre.—Thursday, February 24th. Technical College, Swansea. 6.30 p.m. "Switchgear Developments." Mr. W. E. J. Farvis.

Hampshire Sub-Centre.—Friday, February 25th. Kimbell's Café, Southsea. Annual conversazione and dance.

Nottingham Society of Engineers.—Monday, February 21st. The Welbeck Hotel, Nottingham. 7.30 p.m. Joint meeting with Institution of Mechanical Engineers (East Midlands Branch). "Protection of Engineering Works Against Air Raids." Lt.-Col. H. G. MacGeorge.

Electrical Power Engineers' Association (*London Local Group*).—Tuesday, February 22nd. North Met. E.P.S. Co.'s Theatre, Wood Green. "Television." Mr. A. H. Bennett. (*Manchester Technical Group*).—Thursday, February 24th. Engineers' Club, Manchester. 7.15 p.m. "The Application of Electricity to Domestic Water Heating Contrasted with Alternative Methods." Mr. P. C. Honey.

Paisley Association of Electrical Engineers.—Tuesday, February 22nd. 39, High Street, Paisley. 7.15 p.m. "Electric Discharge Lamps." Mr. M. W. Hime.

Institution of Civil Engineers.—Tuesday, February 22nd. Great George Street, Westminster, S.W.1. 6 p.m. Three papers on the "Galloway Hydro-Electric Scheme." Messrs. W. Hudson and J. K. Hunter, W. Hawthorne and F. H. Williams, and R. W. Mountain.

British Electrical Development Association.—(*S.W. England and S. Wales (Southern) Area*).—Tuesday, February 22nd. Royal Hotel, Bristol. 12.45 for 1 p.m. Annual luncheon. (*S.W. England and S. Wales (Northern) Area*).—Wednesday, February 23rd. Park Hotel, Cardiff. 12.40 for 1 p.m. Annual luncheon.

Belfast Association of Engineers.—Wednesday, February 23rd. "Modern Practice with Glass Bulb Rectifiers." Mr. A. M. Browne.

Institute of Marine Engineers.—Friday, February 25th. Connaught Rooms, London, W.C.2. Annual dinner.

Physical Society.—Friday, February 25th. Imperial College of Science and Technology, South Kensington, S.W.7. 5.15 p.m. Presidential address by Mr. Thomas Smith and short papers.

Junior Institution of Engineers.—Friday, February 25th. Hollywood Suite of Princes Galleries, Piccadilly. 6.45 for 7.15 p.m. Institution dinner.

Notes

Municipal Electrical Engineers' Salaries

At a meeting of the Fulham Borough Council on Wednesday it was reported that a letter had been received from the District Joint Board of Employers and Members of Staff for the Electricity Supply Industry (Area No. 10) intimating that the salaries and conditions of service of municipal chief electrical engineers had been discussed at a conference of representatives of the thirteen districts forming the National Joint Board. It had been decided that it was desirable to establish national and district conciliation machinery, to be recognised by the Minister of Labour as the appropriate machinery for dealing with the salaries and conditions of service of chief electrical engineers, and inviting the Council to appoint a representative to attend a meeting of representatives of all the undertakings in the No. 10 Area for the purpose of electing six representatives to form the employers' side of the proposed new conciliation authority. The meeting is to be held on February 25th at the Ministry of Labour.

E.A.W. Activities

Of the fifty-eight candidates who sat for the Electrical Association for Women's winter examination for the electrical housecraft certificate for demonstrators, forty-eight passed (four with distinction), bringing the total number of demonstrators holding the certificate to 517. There were seventy-six entrants for the housecraft certificate for teachers, and of these sixty were successful (eight with distinction), bringing the total number of holders to 418.

It is the installation costs and overhead charges rather than the cost of electricity that are hindering domestic electrical development. This was the general opinion of a recent meeting of the Association held at Manchester to discuss "The Laywomen's Point of View on Electrical Equipment." It was decided to urge that a certain number of electrical appliances should be provided free in flats for rehousing slum-dwellers.

A new branch has been formed at Walsall. The Mayoress, Mrs. E. P. Drabble, has been elected president, Mrs. Prentice chairman, and Mrs. Patten secretary.

Mining Electrical Engineers' Dinner

The annual dinner of the South Wales Branch of the Association of Mining Electrical Engineers was held on February 12th at the Queen's Hotel, Cardiff, when Mr. J. V. Harries (branch president) took the chair. Among those present were Mr. J. A. B. Horsley (president of the Association), Major E. I. David (president, South Wales Institute of Engineers), and Mr. C. T. Allen (South Wales Electric Power Co.). Mr. I. R. Williams (joint secretary, Mon. and S. Wales Coalowners' Association), in proposing the toast of the "Association," referred to the good spirit which prevailed in the South Wales mining industry, and invited the Association to approach the coalowners to discuss their problems. Mr. Horsley, in responding, said that the increasing use of electricity in mines depended not only on its ability to give efficient and economic service, but upon its freedom from danger.

World Power Conference

At the sectional meeting of the World Power Conference, to be held in Vienna from August 25th to September 2nd, the following electrical papers will be presented: "The Supply of Electricity for Agriculture," by C. A. Cameron Brown (B.E.A.I.R.A.); "Electricity for Small-Scale Industries," by J. N. Waite and F. H. Clough; "The Supply and Use of Electricity in the Home," by J. W. Beauchamp; "Street Lighting in Great Britain," by Dr. H. F. Gillbe; "Electric Lighting for Streets and Transport," by W. J. Jones; and "The Requirements and Supply of Energy for Electric Railways," by F. Lydall.

Rural Electrification Co-ordination Committee

With a view to expediting rural electrification and more economical applications of electricity, especially to agriculture, the Electrical Research Association has established a co-ordinating committee on which all the interests are or will be represented, to secure more effective co-operation and the planning of necessary research programmes and recommendations for standardisation. The Research Department will be in charge of Mr. C. A. Cameron Brown, B.Sc., A.M.I.E.E., late of Oxford University Agricultural Bureau.

Our Service Department

EVERY day inquiries of all kinds are received by the Editors, the bulk of them relating to the producers of specified classes of electrical goods. We are able to reply to most of these with the aid of our extensive records, but in a few cases we have to seek the assistance of our readers. This week we have been asked for the names and addresses of manufacturers of the following:—

Loading powder for cartridge fuses.
SINCLAIR insulators.
MINERO lamp.
JUNIT clock.

Readers should enclose stamped addressed envelopes when making their inquiries.

Our Personal Column

Electrical men are invited to keep readers of the "Electrical Review" posted concerning their movements

Mr. J. Shaw, general manager, secretary and engineer of the Mersey Railway Co., is retiring on February 24th. **Mr. R. Varley,** assistant to the general manager and engineer, will become acting general manager and engineer, and **Mr. J. E. Blacklin,** accountant and assistant to the secretary, will be secretary and accountant.

Mr. H. T. W. Millar, A.M.I.E.E., Edinburgh, has been appointed telephone manager at Cambridge under the Post Office Regional Scheme. A native of Edinburgh, Mr. Millar was educated at George Heriot's School and Heriot-Watt College, and obtained a B.Sc. honours degree at the University of London. He entered the service in 1927 as an assistant engineer. In 1931 he was appointed chief design engineer to the Egyptian Telephone Administration, returning to this country in 1934. In 1935 he was appointed sectional engineer in the Edinburgh district.

Mr. A. G. Robertson has joined the London sales staff of Thermovent (E. K. Cole, Ltd.). **Mr. D. S. Leghorn,** late of the Liverpool Corporation Electricity Department, has joined the company as heating engineer, and will be in charge of the design of space heating installations. He will also supplement the services of the travelling sales staff in providing detailed technical advice.

Dr. F. B. Jewett, president of the Bell Telephone Laboratories and vice-president of the American Telephone & Telegraph Co., has been chosen to receive the Washington Award for 1938. This award is given annually to the engineer whose work is considered to have contributed most to human progress. A past-president of the American Institute of Electrical Engineers, Dr. Jewett has had a long and distinguished career as an electrical engineer. In 1936 Harvard University awarded him the honorary degree of Doctor of Science and the Franklin Institute of Philadelphia gave him the Franklin Gold Medal. Recognition of his work came from this country in 1935 when the Council of the Institution of Electrical Engineers awarded him the Faraday Medal.

Mr. T. Milnes has been appointed manager of the electrical department of George Cohen Sons & Co., Ltd., at their Northern Works at Stanningley, near Leeds.

Mr. A. Murdoch, power house engineer with the Fulham Borough Council Electricity Department, is to retire on superannuation. He entered the service of Fulham Borough Council in 1901 as assistant engineer, and was appointed power house engineer in 1926.

Mr. W. Hodgson Inman, electrical engineer and contractor, is to contest the by-election in Queen's Ward, Lancaster, where a vacancy has occurred. Mr. Inman has been in business since 1912 and prior to that was charge engineer of the Corporation Electricity Department. He was the first chairman of the Lancaster Branch of the Electrical Contractors' Association.

The private address of **Mr. W. L. Cornish,** A.M.I.R.E., is now 27, Seaton Avenue, Plymouth.

Mr. C. H. Sparks, M.A., A.M.Inst.C.E., A.M.I.E.E., who has been elected president of Faraday House Old Students' Association for 1938-39, studied at Faraday House for a year before going to Cambridge where he took his degree in the Mechanical Science Tripos in June, 1914. As a university candidate he was gazetted to the Royal Artillery at the outbreak of the war, retiring as captain in 1920. Subsequently he completed his training in Scotland with Babcock & Wilcox, Ltd., and afterwards entered their employment. After some experience aoroad he was appointed chief engineer to the company in 1936. Mr. Sparks is the second son of Mr. C. P. Sparks, a past president of the Institution of Electrical Engineers, and of the Faraday House Old Students' Association.

Mr. George Balfour, M.P., chairman of the London Power Co., whose speech at the annual meeting of the company is reported in our "City Notes"

Mr. C. H. Bennett has been appointed sales representative of Ferranti, Ltd., for the company's domestic appliance department in the London area. Mr. Bennett will handle Ferranti fires, thermal storage water heaters and immersion units, of which he has had wide experience both in the factory and as an outside representative. For several years he has represented the company in the West of England for these products.

Mr. N. T. Smith, borough electrical engineer to the South Shields Corporation, who is to receive the final increment of £50 in April next, under his agreement with the Corporation, is to be granted two further annual increments of £50, the first to be payable on April 1st, 1939, making his ultimate maximum salary £900 per annum. At a recent meeting of the Corporation an amendment was moved by Councillor E. Hill that the proposal be referred back to Committee for reconsideration. Councillor Hill said that Mr. Smith's two years' agreement would not expire for two or three months, and he thought the Committee should wait until the end of the period before considering a further advance. The amendment was defeated and the Committee's recommendation was adopted.

Mr. A. E. Overton (Board of Trade) and **Mr. N. E. Archer** (Dominions Office) sailed on Wednesday last in the *Queen Mary* for the United States, where they will assist the British Ambassador in Washington in the negotiations for an Anglo-American trade agreement.

Mr. T. Lang Moffat, director of Moffats, Ltd., Blackburn, has been appointed managing director of the company. He takes the place of his brother, **Mr. D. R. Moffat,** who is leaving for Canada to take over the company's Canadian interests.

Mr. T. L. Moffat **Mr. N. D. Moffat**

Mr. D. R. Moffat will, however, remain on the board of the company. Mr. Lang Moffat has been connected with the cooker and refrigerator industry for the greater part of his business career. **Mr. Norman D. Moffat** will become a co-director of Moffats, Ltd.

We recently reported that **Mr. D. Grant Strachan** had expressed a wish to retire from the position of director of the Radio Manufacturers' Association during the current year. This week the Association is advertising for a successor to Mr. Strachan.

Obituary

Mr. W. M. D. Pell.—In our last issue we briefly recorded the death of Mr. William Major Douglas Pell. Mr. Pell was born in the East, his father, Mr. Bennett Pell, holding the post of superintendent of the Eastern Telegraph Co. in Singapore. About 1890 the Pells returned home and became associated with James Brockie, the inventor of the Brockie arc lamp, later known as the Brockie-Pell. In 1898, the son, Mr. W. M. D. Pell, in conjunction with Mr. Charles Oliver, founded the firm of Oliver & Pell, to manufacture in London an improved form of lamp, the flame arc. This lamp, in its magazine form, was widely used for street and railway lighting up to the commencement of the war. Oliver Pell Control, Ltd., the name of the company carrying on the business, to-day employs 600 people. The funeral took place at Eltham Parish Church on Friday last, and was attended by a large number of the employés of the company. In 1914 Mr. Pell married the daughter of Colonel and Mrs. Sandwith, who pre-deceased him. He leaves a son.

Mr. F. J. Fuller.—We regret to record the death, after a short illness, of Mr. F. J. Fuller, mains engineer with the Beckenham Corporation Electricity Department, at the age of fifty-two. Mr. Fuller had spent practically his whole life with the Electricity Department at Beckenham, where, after starting in the Mains Department, he spent a few years in the power station as a shift charge engineer, and in 1924 was appointed mains superintendent.

Mr. H. Holcroft.—We regret to learn of the death of Mr. H. Holcroft, who for over twenty years was chief electrical engineer to Earle, Bourne & Co., Ltd.

Will.—Mr. T. H. Gardner, chairman and joint managing director of L. Gardner & Sons, left £159,474 with net personalty £147,530.

Financial Section

New Companies. Official Returns of Capital. Debenture Charges. Reports of Electrical Companies. Dividend Announcements. Transactions in Stocks and Shares

New Companies Registered

Schick Dry Shaver (England), Ltd.—Private company. Registered February 9th. Capital, £1,000. Objects: To carry on the business of manufacturers of and dealers in dry shavers and electrical goods, electrical and mechanical engineers, &c. The subscribers are: Mrs. F. L. Schick, 3,527, Redpath Street, Montreal, Canada (by her agent, H. Varley); G. A. Smith, 2, Arbuthnot Lane, Bexley; and E. Edwards, 5, Mayfair Avenue, Whitton, Middlesex. Solicitors: Allen & Overy, 3, Finch Lane, E.C.3.

Radio Service Stations (Beds & Herts), Ltd.—Registered February 12th. Capital, £500. Objects: To acquire the goodwill of the business carried on by S. J. Bennett, at 23, Melson Street, Luton, as "Radio Service Stations." The subscribers are: S. J. Bennett, 125, Ashton Road, Luton, and B. C. O'dell, 57, Brunswick Street, Luton. Secretary: S. J. Bennett.

Victory Lamp Co., Ltd.—Private company. Registered February 7th. Capital, £500. Objects: To carry on the business of manufacturers of and dealers in electric lamps, all kinds of electrical accessories, &c. The directors are: E. C. Wade, 122, Kensington Road, North End, Portsmouth; and A. Claremont, 19, Powis Gardens, Palmers Green, N.W.11. Registered office: 49, London Wall, E.C.2.

Ferrum (Stock Service), Ltd.—Private company. Registered February 8th. Capital, £200. Objects: To carry on the business of manufacturers, importers and exporters of and dealers in vacuum cleaners, electrical fittings, fires, stoves, radio sets, &c. The first director is M. W. J. Dobeyn, C.A., 31, Brookland Hill, N.W.11. Secretary: W. B. M. Unland. Registered office: 2 and 3, Philpot Lane, E.C.3.

Returns of Electrical Companies

Troughton & Young, Ltd.—The nominal capital has been increased by the addition of £25,000 beyond the registered capital of £25,000. The additional capital is divided into 12,000 6 per cent. 2nd cumulative preference and 13,000 ordinary shares of £1.

Electro-Horticultural Equipment Co., Ltd. — Debenture charged on the company's undertaking and property, present and future, including uncalled capital, dated February 1st, 1938, to secure £200. Holders: Associated Electrical Industries, Ltd., Crown House, Aldwych, W.C.2.

Downton & Ivey, Ltd.—C. S. Steel, chartered accountant, of 34 and 36, Gresham Street, E.C., was appointed receiver and manager on February 4th, 1938, under powers contained in debenture dated October 19th, 1933.

F. D. Sims, Ltd.—Debenture charged on the company's undertaking and property, present and future, including uncalled and unpaid capital, dated January 25th, 1938, to secure £10,000. Holder: F. S. Barnes, 6, Albemarle Road, Woodthorpe, Nottingham.

Walton Electric Installations, Ltd.—Particulars filed of debentures not exceeding £500, authorised January 20th, 1938, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £300.

Allan Kennedy & Co., Ltd.—Further charge on the company's undertaking and property dated January 24th, 1938, to secure advances not exceeding £5,235. Holders: Dorman, Long & Co., Ltd., Middlesbrough.

Trevor Fry, Ltd.—Issue on January 18th, 1938, of £50 debentures, part of a series already registered.

Paragon Electric Cleaners, Ltd.—Issue on January 25th, 1938, of £2,000 debentures, part of a series already registered.

British Automatic Refrigerators (1936), Ltd.—Debenture charged on the company's undertaking and property, present and future, including uncalled capital, dated January 19th, 1938, to secure £9,000 (ranking *pari passu* with existing debenture for £16,000). Holders: Branch Nominees, Ltd.

Rival Lamps, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated February 2nd, 1938, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Newhaven Engineering Co., Ltd.—Satisfaction in full on January 31st, 1938, of mortgage dated November 3rd, 1937, and registered November 4th, 1937. (According to the register of mortgages, the mortgage registered November 4th, 1937, originally secured £500.)

Dicona, Ltd.—Satisfaction in full on January 1st, 1938, of debenture in favour of Lloyds Bank, Ltd., dated November 14th, 1934, and registered November 19th, 1934, securing all moneys owing not exceeding £2,000.

Capels Wholesale Wireless Co., Ltd.—Capital, £6,000 in £1 shares. Return dated August 30th (filed December 6th), 1937. 4,500 shares taken up. £1,500 paid. £3,000 considered as paid. Mortgages and charges, £2,000.

Asea Electric, Ltd.—Capital, £250,000 in £1 shares. Return dated January 5th, 1938. All shares taken up. £250,000 paid. Mortgages and charges, nil.

Walsall Electrical Co., Ltd.—Capital, £3,500 in 1,500 preference and 2,000 ordinary shares of £1. Return dated November 1st, 1937. 1,170 preference and 1,840 ordinary shares taken up. £3,010 paid. Mortgages and charges, nil.

Vul-K-Lee, Ltd.—A. D. Walker, of 42, Castle Street, Liverpool, ceased to act as receiver on February 2nd, 1938.

City Notes

The London Power Co., Ltd., held its annual meeting on February 11th, when Mr. G. Balfour, M.P. (chairman), who presided, said that the year 1937 repeated the progress of previous years. The gross receipts were £3,585,429, as compared with £3,297,104 for 1936. The total expenditure on generation and including interest and sinking fund amounted to £3,572,429, leaving a balance of £13,000, of which £10,000 had been placed to reserve and £3,000 was available for payment of the modest and limited dividend on the small share capital of the company. During the year £645,130 was expended on extensions to the generating stations, sundry expenditure on sub-stations and mains and the purchase of an additional steam collier. They had extensions in hand at present for which orders had already been placed amounting to about £1,800,000 (mostly accounted for by Battersea power station extensions). When these extensions were completed they would have an installed capacity of nearly 1,000,000 kW. The output of their generating stations last year amounted to nearly 2,314 million kWh, an increase over 1936 of nearly 152 million kWh, and of this output nearly 1,400 million kWh was used by their constituent companies and a little over 930 millions supplied under special contracts and for grid purposes. They received from the Central Electricity Board for grid and special contracts 0.202d. per kWh. From their constituent companies they received 0.4958d. per kWh. The average cost distributed over the whole supply was 0.374d. per kWh; 118 million kWh was dealt with under special agreements with the Marylebone Council and peak load user of Bow and Grove Road power stations, leaving 819 million kWh put into grid service by the Central Board. The price they received from the Board for this supply was 0.1412d. per kWh. These figures were interesting, particularly when it was realised that 0.025d., or one-fortieth of a penny, on their output was equal to nearly £250,000. They did not expect the Central Board to pay the average rate of the whole output, but they did expect at least one-third of that amount. It must appear absurd that they were paying interest charges on their capital and paying off the principal by sinking fund instalments at an inclusive cost of over one and a half million pounds per annum, and receiving no contribution from the Board, the user of more than one-third of their output. It must be remembered that the Central Board received a very different figure under the grid tariff, and on the sale of 819,000,000 kWh must receive as merchants two or three times the sum which it paid the company for its supply. This state of affairs should not be allowed to continue or any Act remain unaltered which permitted such injustice. Battersea generating station continued to maintain its record for thermal efficiency, and last year maintained the efficiency of 1936 on the kWh generated at over 29 per cent. The average cost of coal consumed increased by 2s. 1½d. per ton, and, judging from forward contracts already placed, the price would be increased still further during the current year. Wages also showed a substantial increase, but notwithstanding this increase they were hopeful that they would, with increased output and rising efficiency, be able to avoid an increase in the average cost for the current year. With regard to the revival of the question of a Thames Barrage, in the absence of further information than was available at the moment, they did not see how they would be able adequately to fuel their up-river stations if any barrage was permitted.

The Yorkshire Electric Power Co. reports a net profit for 1937 of £569.180, as compared with £535,628 in the preceding year. To this is added £83,970 brought in, making £653,150. The ordinary dividend for the year is 8 per cent., less tax, £260,000 is placed to depreciation and reserve fund, £75,000 to plant renewals fund, and £95.115 is carried forward. The report shows that 415.542.385 kWh was sold to the company's consumers (against 366,157,774 kWh), and 136,245,430 kWh was sold to the Central Electricity Board (against 90,249,889 kWh). The new plant at Thornhill power station has been in regular use during the year and has contributed substantially to the increased output. The enlargement of the Ferrybridge power station is in progress. The North Lincolnshire and Howdenshire Co.'s output continues to grow. After making provision for depreciation and reserves, that company paid a dividend for 1936 which is included in this year's revenue. The debenture stock of the Yorkshire Waste Heat Co., amounting to £47,000, was repaid on December 31st. The payments made by the Power Co. in respect of interest and provision for repayment of the stock will now cease. To meet capital requirements the company has, since the close of the year, made a further issue of 3¼ per cent. redeemable debenture stock, so that the whole of its present borrowing powers have been exercised. Further capital will, in due course, be required to provide for the extension of its undertaking, and at an extraordinary meeting which will follow the ordinary meeting on February 21st a resolution will be submitted for approval to the issue from time to time of such further capital as the company may require up to the amount which it is now authorised to issue.

Ismay Industries, Ltd.—An extraordinary meeting was held on February 15th at which resolutions were passed for increasing the capital to £2,000.000 by the creation of 300.000 £1 first preference shares, 800,000 5s. convertible second preference shares, and 1,300,000 5s. ordinary shares. Mr. J. Ismay (chairman and managing director), who presided, said that they had been able to acquire the Cossor business on favourable terms. A large part of one of that company's factories was almost entirely employed on Government work, and the company was in a favourable position to expand and develop into many other lines in the electrical industry. It was proposed to enter this field in close co-operation with the associated companies of Ismay Industries. They were satisfied that Cossor's sales for January and February would exceed those of the first two months of last year on a normal rate of profit.

They had decided to form a public company—A. C. Cossor, Ltd.—and make an issue to the public of a certain number of preference and ordinary shares. One of the chief expansions of Ismay Industries was in connection with hire-purchase. They were extending that business on a large scale and the Hire-Purchase Finance Corporation, Ltd., which was one of their wholly-owned subsidiaries, had entered into an agreement with one of the trade federations under which it would finance hire-purchase agreements. They, as Ismay Industries, did not intend to make any public issue or issue to the shareholders.

The Allgemeine Elektricitäts Gesellschaft reports that for the year ended September 30th last the value of the turnover amounted to 397 million Rm., as compared with 316 million Rm. in the preceding financial year. The value of the orders received reached 576 million Rm., as against 380 million Rm. in 1935-36, so that the stock of orders brought over into the new year shows a considerable increase over the previous period. All departments participated in the revival in trade, the foreign turnover in particular showing an increase, and the improvement has continued in the new financial year. The number of persons employed rose from 49,000 at the end of September, 1936, to 57,000 at the close of the corresponding month in 1937. Depreciation on plant and buildings, &c., has been placed at 5,926,000 Rm., and a further 3,268,000 Rm. is allowed for other writing down. The net profits are returned at 7,505,209 Rm. The directors recommend a dividend, the first for several years, of 4 per cent. on the ordinary shares. The allocation to the reserve fund amounts to 2,333,000 Rm.

The English Electric Co., Ltd., reports a trading profit for 1937 of £552,185, as compared with £356,992 in the preceding year. From this the following appropriations have been made:—Debenture interest, £50,000; directors' fees, £2,250; trustees' fees, £250; depreciation, £53,500; and amount written off expenses of issue of 4 per cent. debenture stock, £10,000. The net profit for the year is £436,185 (against £235,306), to which is added £36,279 brought in. It is proposed to pay a dividend of 10 per cent. for the year on the ordinary stock (against nil), to place £200,000 to reserve, and to carry forward £54,287. The last ordinary dividend was 5 per cent. in 1924. Last year three years' dividend was distributed on the preference shares clearing off all arrears. The directors report that the company enters on the year with the largest order book in its history. Although the rate of expansion in business shown during the last few years cannot continue indefinitely, the number and importance of inquiries received are well maintained and the directors are satisfied that a large volume of work both for the home and export markets is in prospect.

The London Electric Supply Corporation, Ltd., reports a profit for the year ended December 31st of £110,224, as compared with £87,388 in the preceding year. To this is added £66,852 brought in and £32,085 interest on investments, making £209,161. After deducting interim dividends, there is a balance of £161,961, which is brought up to £173,991 by transferring £12,030 from No. 2 reserve. It is proposed to pay a final ordinary dividend of 4 per cent. and a special bonus of 3 per cent. in celebration of the jubilee year of the company, making a total distribution of 10 per cent. (against 8 per cent.). The balance carried forward is £91,826. The amount of consumers' benefit for 1937 is £85,166, and the consequent shareholders' benefit £14,194. The sales of electricity during the year amounted to 379,607,000 kWh, as compared with 367,224,832 kWh in 1936. Meeting: March 1st.

The Power Securities Corporation, Ltd.—Presiding at the annual meeting on February 16th, Mr. G. Balfour (chairman), said that last year they handled more financial business than in the previous two or three years, including underwriting or placing of debentures, preference and ordinary shares of industrial and public utility undertakings mostly in Great Britain. During last year they carried out a large amount of contract work at home and abroad and completed many works, including the tunnel from Loch Garry to Loch Ericht, and power station plant extensions in Malaya, East Africa and at home amounting to over £1,700,000, and they still had in hand work amounting to over £1,500,000. The work on the Kut Barrage was progressing according to plan. With regard to the future there was a considerable volume of financial and engineering work in prospect, and on the whole the outlook was clearer than for many years.

The City of Buenos Ayres Tramways Co. (1904) reports a net revenue for 1937 of £70,038 (against £71,681), including annuity paid by the Anglo-Argentine Tramways Co., to which is added £1,135 brought in. The final dividend is 1s. 3d. per share, making 5s. per share (same), amortisation fund receives £8,000, and £1,173 is carried forward. The directors have been approached by the Anglo-Argentine Tramways Co., with an intimation that they are forced to ask for a temporary moratorium in respect of the annuity payable by them, and negotiations are now proceeding.

Waygood-Otis, Ltd., reports a net profit for 1937 of £136,261, as compared with £161,977 for 1936. Reserve for pensions again receives £10,000, but no allocation is made to contingencies reserve (against £30,000). The final ordinary dividend is 12½ per cent., maintaining the dividend for the year at 25 per cent., plus a special bonus of 20 per cent. (against 15 per cent.). The balance carried forward is £13,279 (against £26,513 brought in).

The Electric Construction Co., Ltd., has completed arrangements for the private placing of 37,220 £1 7 per cent. cumulative preference shares. This placing will bring the total in issue up to the authorised amount of £100,000. The new money is required to finance an increased volume of work passing through the shops and big Admiralty orders just secured for completion during the current year.

The Rawlplug Co., Ltd., reports a net balance for 1937 of £64,311, as compared with £60,624 in the preceding year. A final dividend of 30 per cent. is paid on the ordinary shares, making 40 per cent. for the year (against 35 per cent.), reserve receives £10,000, and £21,997 is carried forward (against £20,436 brought in).

The Mersey Railway Co. reports a net revenue for 1937 of £89,006, as compared with £89,049 in the preceding year, to which is added £2,167 brought in, making £91,173. After providing for debenture interest and placing £1,000 to general reserve, it is proposed a pay a dividend of ⅞ per cent. on the consolidated ordinary stock, leaving £2,201 to be carried forward.

Mather & Platt, Ltd., report a profit for 1937 of £209,786, as compared with £180,339 for 1936, and an available balance of £278,758 (against £240,974). The ordinary dividend for the year is 13½ per cent., less tax (against 11 per cent., less tax, and a bonus of 2 per cent., tax free), and £74,664 is carried forward.

Edmundsons Electricity Corporation, Ltd., reports that the results of the operations of its group of companies during January as compared with the corresponding month of 1937 show an increase of 12 per cent. in kWh sold.

The Midland Electric Manufacturing Co., Ltd., is paying a dividend of 10 per cent. for 1937, plus a bonus of 15 per cent., making 25 per cent., less tax. This is at the same rate as for 1936, but is paid on larger capital.

The Radio Corporation of America in its preliminary statement for 1937 shows a net profit of $9,000,000 (£1,800,000), equivalent to 41 cents per common share. The net profit for 1936 was $6,156,000 (£1,231,200), equal to 20 cents per share.

Pye (Ireland) reports a net profit of £8,649 in the first trading period to December 31st. It is proposed to pay a dividend of 11 per cent. and to carry forward £1,201.

The County of London Electric Supply Co., Ltd., is paying a final dividend of 7½ per cent., less tax, on the ordinary stock, maintaining the dividend for the year at 10½ per cent.

The Consolidated Signal Co., Ltd., reports a net profit for the year ended September 30th of £51,416 (against £44,449 for 1935-36). A dividend of 36½ per cent. is paid on the ordinary stock (against 30 per cent.), and £904 is carried forward.

The South London Electric Supply Corporation, Ltd., has declared a final ordinary dividend of 4 per cent., less tax, making the standard dividend of 7 per cent. for the year (unchanged).

The Electrical Distribution of Yorkshire, Ltd., is paying a final dividend of 4½ per cent., making 9 per cent. for the year (same).

The Telegraph Construction & Maintenance Co., Ltd., has announced a final dividend of 5 per cent., making 10 per cent. for 1937 (against 7½ per cent.).

Stocks and Shares

TUESDAY EVENING.

THE outstanding feature of the Stock Exchange markets is again the firmness shown by the purely gilt-edged issues. Every week seems to emphasise the complex of caution that exists in the minds of the public so far as industrial shares are concerned. The foreign political outlook is restraining people from putting money into the shares of trading companies; the approach of Budget time is another factor which subdues optimism. A variety of minor causes adds to political confusions. The fact remains that gilt-edged stocks alone command, at the present time, any large following amongst the public. The great majority of company reports now being issued are favourable to shareholders. They show profit increases, and, in a fair number of cases, an advance in dividends. Nevertheless, prices tend to sag. Here and there speculative investment is sufficiently vital to absorb such stocks as Cable and Wireless and others where the outlook definitely encourages the hope of future expansion in earnings. But industrial share prices are heavy, and, to quote a well-worn Stock Exchange phrase, the selling is better than the buying.

Electrical Equipment and Manufacturing

Prices in the industrial markets are having difficulty in holding their own against the hesitant feeling which exists concerning the likely course of events in trade at home as well as in politics abroad. Following the previous week's rather severe price falls in General Electrics, Crompton Parkinsons and others, there are further declines of half-a-crown or so in this week's list of electrical equipment shares. General Electrics are again among the weaker spots, with a drop of 1s. 6d. to 71s. 6d. Aron Meters at 1⅞ are ¼ lower, and British Insulated have shed 1/16 to 4⅝. Enfield Cables have fallen below 5, bringing the yield to over 5 per cent. on the money. Associated Electricals are down to £2. British Aluminiums have gone back to 42s. 6d.; Reyrolles, at 56s. 6d., and Chloride Electrical at 67s. 6d. are also on the dull side. The persistency of the selling pressure that has caused these falls is a matter which rather mystifies the industrial market. As is usual at times when the reason for selling is hard to trace, rumour toys with the word liquidation. It need mean so little: it can cover so much.

Better Dividends

Expectation was more than satisfied by the English Electric dividend and profits. In paying 10 per cent. on the ordinary capital, the company returns to the dividend list for the first time since 5 per cent. was paid in 1924. Profits were not far from being double those of the previous year. The price of the shares has advanced by 1s. to 30s. 6d., which rise must be accounted quite sizeable in these quiet markets. Allowing for the dividend in the price, the shares pay £6 18s. per cent. on the money, or substantially more than the average return on electrical equipment issues. As was to be expected, profits are being distributed with some eye to the strengthening of the balance sheet. Earnings are equal to 30 per cent. on the ordinary capital. Consolidated Signals responded with a half-crown rise to 5¼, on the declaration of a dividend of 36½ per cent., which compares with last year's 30 per cent. The increase was a natural sequel to the raising of the Westing-

house Brake dividend, but was evidently more than had been generally expected. The shares pay close on 7 per cent. on the money at their present price. Hopes concerning the dividend on Telegraph Constructions were evidently pitched too optimistically, for the price has fallen 3s. 9d. to 45s., since the announcement of a 10 p.c. distribution, or 2½ p.c. more than last year's.

London Transport "C" Stock

The market is much intrigued by references made by the chairman of Thomas Tilling, at the annual meeting, to his company's holding of London Transport "C" stock. After explaining that the writing down of this item in the books was no reflection on its intrinsic value, Mr. Heaton gave it as his opinion that a full standard 5½ per cent. dividend on the stock might reasonably be looked for in the current crucial year: crucial, because the Transport Board lays itself open to the appointment of a receiver unless the standard rate is paid. No whys or wherefores were offered in support of this view, so that speculation has been left to draw its own conclusions. It is considered that, if the Transport Board continues this year to provide for renewals on the same generous scale as before, the remaining profits are not likely to expand by the extra £325,000 or so which would be wanted for the raising of the "C" stock dividend from 4½ to 5½ per cent. At the same time, this sum is regarded as small in comparison with the £2,400,000 allocated last year to the renewals and maintenance reserve, which stands now at over £8½ millions. The inference is that it will be possible to satisfy the "C" stock's standard requirements by no more than a small sacrifice of financial conservatism. On the question of whether this course of action will appeal to the Board, Mr. Heaton's view is not without influence on expectations. As a result, the price of the stock has risen 2 points to 83. On last year's dividend of 4½ per cent., the yield is under 5 guineas per cent.; on a 5½ per cent. payment the return would be over 6½ per cent.

Cable and Wireless

On the hope of an early agreement between Cable and Wireless and the Empire Governments, the price of Cable and Wireless ordinary stock rose from 63 to 66, before reacting to 65. The bullish view looks for a reduction in the rental paid for the beam wireless stations, as well as in the cost of maintaining the cables. Since these items accounted for about £700,000 of last year's expenses, there is plenty of scope for stockholders' hopes. According to one rumour, the Government may be prepared to forgo the beam rental in exchange for some £3 millions of the combine's ordinary stock, and to pay a substantial lump sum towards maintenance costs. Whatever the truth may prove to be, the prospect of some relief in these directions serves to strengthen confidence in the company's ability to fulfil its own forecast of a 4 per cent. dividend next June. In this there is compensation for the uncertainty which clouds the future of international trade and, consequently, the prospects of Cable and Wireless.

Trams, Tractions and Rails

Bullish interest in Buenos Aires transport stocks has apparently blown itself out, for the time being, following the outburst of activity which preceded publication of the city's transport co-ordination scheme. As a result, Anglo-Argentine Tramway debenture stocks, which have been most in the limelight, are temporarily back in semi-obscurity, with the five per cents lower at 20, the "fours" at 34, and the four-and-a-half per cents at 24. Under the proposed scheme, the various transport companies will hand over their services—in much the same way as happened in the case of our London Transport Board—in exchange for stock in the new consortium. The latter is promised operating conditions sufficiently easy for it to earn up to 7 per cent. on its capital. The result will be to convert the existing companies into more or less holding concerns depending on income from the consortium stock to pay their debenture interest. So far as the market is concerned, many people expect a quieter spell until some progress has been made in putting the scheme into practical effect. The Home Railway market's dividend "season" opened with a pleasant surprise from the Southern, a satisfactory declaration by the Great Western and a disappointment from the L.M.S. The net result has been to leave prices generally lower than they were before. Lancashire Transport shares rose 1/3, to 34/9, on the announcement of a dividend making 10 per cent. for the year, against last year's 7½ per cent.

American Affairs

Investors continue to watch, without much reward, for the upturn in America's fortunes which should do a great deal to accelerate the pace of international trade. Nevertheless, while there is little in the news to indicate a return of industrial vitality, the tolerably steady condition of Wall Street suggests a not altogether despondent view of the chances of business under Mr. Roosevelt's regime. American Telephone and Telegraph stock, at 134½, remains depressed by fears of what will be contained in the coming Federal Communications Committee's report. Western Unions, at 25, are 2 points better, although the 1937 report shows that a rise in gross revenue was converted by higher taxes and working expenses into a net profit of well under half the previous year's figures. Results such as these are becoming unpleasantly familiar to the holder of stock in United States utility and other industrial concerns.

Share List of Electrical Companies

	Dividend. Nom.	Previous.	Last.	Price Feb. 15.	Rise or Fall.	Yield p.c. £ s. d.
HOME ELECTRICITY COMPANIES.						
Bournemouth and Poole	1	15	15	67/6	—	4 9 0
City of London	1	7½	7½	34/–	—	4 8 3
Clyde Valley	1	7	8	41/–	—	3 18 1
County of London	1	10½	10½	51/–	—	4 2 4
Edmundson's 7% Pref.	1	7	7	32 6	—	4 6 2
Do. Ord.	1	8	9	38/–	—	4 14 9
Elec. Dis. Yorkshire	1	9	9	43/–	+1/–	4 3 10
Elec. Fin. and Securities	1	12½	12½	51/3	—	4 17 6
Elec. Supply Corporation	1	11	12	52/6	—	4 11 5
Lancs Light and Power	1	7½	7½	35/–	—.	4 5 9
Lond. Assoc. Electric	1	—	7	32/–	—	4 7 6
London Electric	1	8	7	35/6	—	3 19 0
London Power Deb. Red.	Stock	5	5	108	—	4 12 7
Metropolitan	1	10	10	46/–	—	4 7 0
Midland Counties	1	7½	8	37/6	—	4 5 0
Mid. Elec. Power	1	8	9	2 1/8	—	4 7 4
North Eastern Electric Ordinary	1	6	7	32/–	—	4 7 6
Do. 7% Pref.	1	7	7	33/–	—	4 4 10
Northampton	1	10	10	47/6	—	4 4 3
Notting Hill 6% Pref.	10	6	6	14	—	4 5 9
North Met. Elec. Ordinary	1	10	10	48/9	—	4 2 0
Do. do. 6% Pref.	1	6	6	30/–	—	4 0 0
Scottish Power	1	8	8	37/6	—	4 5 4
South London	1	7	7	32/6	—	4 6 2
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	21/–	—6d.	7 2 10
Yorkshire Elec.	1	8	8	40/–	—	4 0 0
PUBLIC BOARDS						
Central Electricity, 1950–70	Stock	5	5	113	+1	4 8 6
Do. 1955–75	„	5	5	117	—	4 5 6
Do. 1951–73	„	4½	4½	111	—	4 1 1
Do. 1963–93	„	—	3½	100	+1	3 10 0
London Elec. Trans Gtd.	„	—	2½	91	—	2 15 0
London & Home Counties, 1955–75	„	4½	4½	112	—	4 0 4
London Passenger Transport, A	„	—	4½	118½	—	3 16 3
Do. do. B	„	—	5	121½	—	4 2 4
Do. do. C	„	4	4½	83	+2	5 2 5
West Midlands Joint Elec. 1948–68	„	—	5	115	—	4 7 0
TELEGRAPH AND TELEPHONE.						
American Tel. & Tel.	$160	9	9	134½	—	6 13 10
Anglo-Am. Tel. Pref.	Stock	6	6	113½	—	5 6 2
Do. Def.	„	1½	1½	27	—	5 11 3
Cable & Wireless 5½% Pref.	„	4½	5½	103	+½	5 6 10
Do. Ord.	„	—	—	65	+2	—
Do. Income	„	—	—	101½	—	3 18 10
Globe Tel. & Tel. Ord.	10	4½*	5½*	14⅜	—	3 14 9
Do. do. Pref.	10	6	6	13⅜	—⅛	4 7 3
Great Northern Tel.	10	20	20	39½	—	5 1 3
Marconi-Marine	1	10	7½	29/6	—	5 1 8
Oriental Telephone Ord.	1	12*	12*	2 1/16	—3/16	4 9 3
HOME AND FOREIGN TRAMS, ETC.						
Anglo-Arg. Trams First Pref.	5	Nil	Nil	7/–	—1/8	—
Do. do. 2nd Pref.	5	Nil	Nil	3/9	—	—
Do. do. 5% Deb.	Stock	Nil	Nil	20½	—2	—
British Electric Traction Def. Ord.	„	5	5	962	—25	—
Do. do. Pref. Ord.	„	8	8	165	—	4 17 0
Brazil Traction	$100	70 cts.	$1	10½	—¼	—
Brit. Columbia Elec. Rly. Pfce.	Stock	5	5	103½	—	4 14 9
Mexican Light Common	$100	Nil	Nil	1½	—⅛	—
Do. 1st Bonds	$500	5	5	35	—	—
Victoria Falls Ord.	1	20	12	3	—	4 0 0
West Riding	1	6½	10	2	—	5 0 0
MANUFACTURING COMPANIES.						
Aron Electricity Ord.	1	15	15	1⅞	—⅛	8 0 0
Assoc. Elec. Ord.	1	8	10	40/–	—1/6	5 0 0
Do. Pref.	1	8	8	38/–	—	4 4 6
Babcock & Wilcox	1	8	10	41/3	—2/–	4 17 0
British Aluminium Ord.	1	7½	10	42 6	—⅛	4 14 1
British Insulated Ord.	Stock	20	20	4⅝	—1/16	4 6 6
Brush Ord.	Stock	Nil	Nil	21½	+1	—
Callender's	1	15	15	4 7/16	—	3 9 1
Do. 6½% Pref.	1	6½	6½	31/3	—	4 2 4
Crompton Parkinson Ord.	5/–	12½	12½	25/–	—	—
Do. 8% Pref.	1	8	8	37/6	—	4 5 4
Electric Construction	1	7	10	1⅝	—	5 14 4
Enfield Cable Ord.	1	25	25	4 1/8	—⅛	5 1 3
English Electric	1	Nil	10	30/6	+1/–	6 11 2
Do. do. Pref.	1	6½	6½	25/6	—	5 2 0
Ericsson Tel.	5/–	20	25*	1 1/8	—	3 4 7
Ever Ready	5/–	35	45	26/–	—	8 13 2
Ferranti Pref.	1	7	7	27/6	—	5 1 10
G.E.C. Pref.	1	6½	6½	32/6	—	4 0 0
Do. Ord.	1	15	17½	71/6	—1/6	4 18 4
Henley's	5/–	30	15	19/6	—	3 17 0
Do. 4½% Pref.	1	4½	4½	1½xd.	—	4 0 0
India-Rubber Pref.	1	5½	5½	22/–	—	5 0 0
Johnson & Phillips	1	½	10	40/–	—9d.	5 0 0
Lancashire Dynamo	1	10	20	2 1/16	—	5 16 4
Siemens Ord.	1	6	7½	28/9	—	5 4 4
Telegraph Construction	£1	7½	10	2½	—⅛	4 0 0

* Dividends are paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings will be taken.

1935

31423. "Automatic frequency regulation of alternating-current supplies." General Electric Co., Ltd., and J. W. Gibson. April 14th, 1936. (478561.)

32120. "Variable condensers." Marconi's Wireless Telegraph Co., Ltd., and T. D. Parkin. July 21st, 1936. (478637.)

1936

11331. "Arc convertors." Allgemeine Elektricitats-Ges. April 18th, 1935. (478638.)

14009. "Electro-deposition of tungsten and its alloys." H. H. Armstrong and A. B. Menefee. May 18th, 1935. (478640.)

16355. "Control of X-ray apparatus." W. W. Triggs (Kelly-Koett Manufacturing Co., Inc.). June 11th, 1936. (478348.)

16648. "Manufacture of electric cables." Callender's Cable & Construction Co., Ltd., L. G. Brazier and E. Tunnicliff. June 15th, 1936. (478353.)

16870. "Automatic tuning correction in radio receivers." Murphy Radio, Ltd., and H. D. Ellis. June 17th, 1936. (478356.)

17009. "Apparatus for maintaining constant voltage." British Thomson-Houston Co., Ltd. June 18th, 1935. (478430.)

19754. "Electric terminal or the like boxes or collars." A. F. W. Richards and H. Bright. July 16th, 1936. (478572.)

19814. "Thermionic valve oscillatory circuits." C. L. Faudell. July 17th, 1936. (478511.)

19870. "Flexible metallic strip suitable for repairing the protecting screen or armouring of an electric cable." C. J. Beaver, N. Dixon, and W. T. Glover & Co., Ltd. July 17th, 1936. (478577.)

19991. "Suppression of high-frequency electrical disturbances." British Electrical & Allied Industries Research Association, and L. H. Daniel. July 18th, 1936. (478546.)

20020. "Road vehicle electric lamps." J. Lucas, Ltd., and W. H. Eggington. July 20th, 1936. (478579.)

20054. "Electric condensers." Dubilier Condenser Co. (1925), Ltd. June 13th, 1936. (478582.)

20076. "Current impulse transmitters." Nationale Telephon-und Telegraphen-Werke Ges. July 20th, 1935. (478702.)

20080. "Automatic volume control systems for vacuum-tube amplifiers." Johnson Laboratories, Inc. July 25th, 1935. (478584.)

20082. "Dynamo-electric machines." P. A. H. Mossay, and Laurence, Scott, & Electromotors, Ltd. July 20th, 1936. (478586.)

20117. "Photo-electric alarm and like systems." K. Nowak. July 19th, 1935. (478366.)

20135. "Electrical interference suppressing devices." C. J. W. Hill. July 21st, 1936. (478704.)

20158. "Means for indicating the blowing of a fuse in the dynamo-battery electrical system of a motor vehicle." C. A. V.-Bosch, Ltd., and W. H. Glaser. July 21st, 1936. (478650.)

20178. "Manufacture of electric-discharge devices." General Electric Co., Ltd., and J. W. Ryde. July 21st, 1936. (Cognate application 13132/37.) (478368.)

20179. "Automatic switch-controlling circuits for automatic telephone or like signalling systems." Automatic Electric Co., Ltd., and I. T. Richards. July 21st, 1936. (478652.)

20186. "Cathode-ray tubes particularly for television." V. Zeitline, A. Zeitline and V. Kliatchko. July 21st, 1936. (478653.)

20193. "Electrical relays." Westinghouse Brake & Signal Co., Ltd. January 16th, 1936. (478654.)

20202. "Radio and other modulated carrier-wave transmitters." Marconi's Wireless Telegraph Co., Ltd., and W. T. Ditcham. July 21st, 1936. (478708.)

20301. "Time-controlled electrical switch." I.G. Farbenindustrie Akt.-Ges. August 14th, 1936. (478662.)

20319. "Cabinet construction." G. W. Johnson (Philco Radio & Television Corporation). July 22nd, 1936. (478594.)

20329. "Electric cables." Norddeutsche Kabelwerke Akt.-Ges. July 22nd, 1935. (Cognate applications 20330/36, 20331/36, 20332/36 and 20333/36.) (478371.)

20339. "Valve amplifying systems for use in sound reproduction." A. H. Stevens (Newton Engineering, Inc.). July 22nd, 1936. (478436.)

20375. "Magnetic focusing coils for electron-discharge tubes." Fernseh Akt.-Ges. July 23rd, 1935. (478666.)

20435. "Electrical heaters for rooms." E. T. Williams. July 23rd, 1936. (478670.)

20468. "Electric-discharge lamps." M. D. Sapiro. November 8th, 1935. (478372.)

20568. "Automatic electric regulators." T. B. Somerville, and Metropolitan-Vickers Electrical Co., Ltd. July 24th, 1936. (478681.)

20643. "Electric cables." British Insulated Cables, Ltd., and H. R. Allen. July 25th, 1936. (478517.)

20843. "Oscillators for scanning or like purposes." Ferranti, Ltd., M. K. Taylor, and J. C. Wilson. July 28th, 1936. (478599.)

20866. "Electric conduit fittings." E. P. S. Cattle. July 28th, 1936. (478521.)

20910. "Cathodes and other electrodes of thermionic discharge apparatus." J. M. Dodds, and Metropolitan-Vickers Electrical Co., Ltd. July 28th, 1936. (478373.)

22477. "Electric condensers." P. A. Sporing. August 14th, 1936. (478602.)

24840. "Circuit arrangements for filtering out a fluctuating frequency from a frequency mixture." Siemens Apparate-und Maschinen Ges. October 9th, 1935. (478605.)

24935. "Communication systems." A. H. Stevens (International Business Machines Corporation). September 12th, 1936. (478447.)

27904. "Electric drives for rolling mills." British Thomson-Houston Co., Ltd. October 15th, 1935. (478610.)

30683. "Secondary emission electron multipliers." General Electric Co., Ltd., and W. H. Aldous. November 10th, 1936. (478613.)

32331. "Electric resistances." Steatit-Magnesia Akt.-Ges. November 20th, 1935. (478390.)

32668. "Clamps for suspending overhead conductor wires of electric railways." K. Eckl. November 28th, 1936. (428615.)

34094. "Circuit arrangement for X-ray apparatus. Compagnie Générale de Radiologie. December 12th, 1935. (Cognate application 34095/36.) (478616.)

1937

2079. "Primary batteries." Soc. Anon. Le Carbone. March 3rd, 1936. (Addition to 435141.) (478396.)

6052. "Ultra high-frequency signalling systems and apparatus therefor." Standard Telephones & Cables, Ltd. (Western Electric Co., Inc.). March 1st, 1937. (478462.)

6300. "Enamelled-wire electrical resistances of low ohmic value." S.E.C.I. Soc. Elettrotecnica Chimica Italiana. March 3rd, 1936. (478464.)

7737. "Arc lamps, and particularly arc lamps for use with kinematographic projectors." Compagnie Radio-Cinema. March 25th, 1936. (478467.)

7931. "Mounting of electric switches." A. F. Bulgin and A. F. Bulgin & Co., Ltd. March 18th, 1937. (478468.)

8888. "Radio directing and direction-finding systems." Standard Telephones & Cables, Ltd. April 9th, 1936. (478470.)

9526. "Operation of modulated high-frequency transmitters and Class B low-frequency amplifiers." J. J. Pohjanpalo. April 3rd, 1937. (478552.)

9753. "Electric heating plates." E. Challet. January 13th, 1937. (478473.)

11150. "Short-wave oscillation apparatus." Marconi's Wireless Telegraph Co., Ltd. April 22nd, 1936. (478474.)

11736. "Cathode-ray tubes." Marconi's Wireless Telegraph Co., Ltd. May 12th, 1935. (478475.)

14510. "Cathode-ray tubes." Zeiss Ikon Akt.-Ges. May 28th, 1936. (478410.)

15221. "Piezo-electric crystal mountings." Standard Telephones & Cables, Ltd. June 12th, 1936. (478483.)

15360. "Circuits for multiplying or dividing the frequency of high-frequency and ultra-high-frequency oscillations." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. June 5th, 1936. (478413.)

18367. "Laminated cores for electric transformers and like apparatus." Akt.-Ges. Brown Boveri & Cie. August 14th, 1936. (478491.)

18407. "Suspension of electrodes for electric furnaces." Norske Aktieselskab för Elektrokemisk Industri. July 8th, 1936. (478556.)

19677. "Electrically driven fans." Siemens-Schuckertwerke Akt.-Ges. July 17th, 1936. (478417.)

29172. "Pendant electric switches." Ward & Goldstone, Ltd., and S. Goldstone. October 26th, 1937. (478636.)

30401. "Cathode-ray tube apparatus for transmitting images of an object to a distance." V. Zeitline, A. Zeitline and V. Kliatchko. May 18th, 1935. (Divided out of 477326.) (478499.)

35103. "Suppression of high-frequency electrical disturbances." British Electrical and Allied Industries Research Association and L. H. Daniel. July 18th, 1936. (Divided out of 478646.) (478693.)

1938

786. "Echo sounding apparatus." H. Hughes & Son, Ltd., and D. O. Sproule. July 30th, 1936. (Divided out of 21073/36.) (478694.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from February 9th :—

Star. No. 579761. Class 6. Electrically operated shaving machines and parts thereof.—Ever-Ready Razor Products, Ltd., Ever-Ready Corner, The Hyde, Hendon, N.W.9.

Strobatic. No. 580453. Class 8. Philosophical and scientific instruments and apparatus for useful purposes.—General Radio Co., Cambridge, Mass., U.S.A. (British representatives: Stevens, Langner, Parry and Rollinson, 5-9, Quality Court, Chancery Lane, W.C.2).

Londex (lettering and design). No. 582377. Class 8. Philosophical and scientific instruments and apparatus for useful purposes.—Londex, Ltd., Brettenham House, Lancaster Place, Strand, W.C.2

Wendelight. No. 580631. Class 8. Light reflectors and light projecting devices in the form of lenses.—Wendelight, Ltd., 10, George Street, Hanover Square, W.1.

Ergophos. No. 580928. Class 15. Opal glass electric lamp shades.—Megaphos Gesellschaft Leopold Weinstein & Co., Vienna. (British representatives: Keates & Co. (Electrical), Ltd., 913, Bishopsgate, E.C.2.)

Intel (lettering and design). No. 581806. Class 18. Electrically operated radiators for heating the interior of buildings.—J. E. Barber, 73, Baldry Gardens, Streatham Common, S.W.16.

Orobello. No. 581751. Class 50. Compositions made from phenol, formaldehyde and metal shavings, the formaldehyde predominating; sold in rods, strips, bars and blocks.—Orobello, Ltd., 10-11, Austin Friars, E.C.2.

Cantor Lectures

Three Cantor Lectures will be given by Mr. C. J. Smithells, of the research staff of the General Electric Co., Ltd., on February 28th and March 7th and 14th at the Royal Society of Arts, John Street, Adelphi, W.C.2. His subject will be "Gases and Metals."

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Accrington.—School, Spring Hill, for the E.C.

Alperton (WEMBLEY).—Factory and warehouse, Mount Pleasant, for Bengue & Co., Ltd.; G. A. Sexton & Co., architects, 52, Kilburn High Road, London, N.W.6.

Banbury.—Factory for Switchgear & Equipment Co., Ltd., Southam Road.

Barrow-in-Furness.—Houses (16), Hawcoat Lane; J. Parkinson & Sons, Ltd. Houses (50), Rating Lane; J. Whittaker (Builders), Ltd.

Blackpool.—Houses (73), Penrose Avenue; R. Fielding & Son. Houses, Walpole Avenue, South Shore estate, for A. Turner, 14, Dunes Avenue, South Shore; Whittaker & Gardner, architects, 16, Edward Street. Transport offices; Halstead Best, architect.

Bradford.—Houses (20), Brantwood Road; M. & N. L. Proctor.

Burton-on-Trent.—Houses (189), Roslington Road (£84,000); borough engineer. Transport offices, Guild Street (£8,850); A. Holmes & Sons, Ltd. Extensions to Town Hall (£41,673); T. Lowe & Sons, Ltd.

Cheshire.—School, Town Lane, Bebington (£11,974), for the E.C.; Thomas Warrington & Sons, contractors, Ellesmere Port.

Chester.—County offices; Trussed Concrete Steel Co., Ltd., engineers.

Chesterfield.—Houses (38), Green Bank Drive; F. Longden & Sons, 138, Ashgate Road.

Chorley.—Houses (54), Hillcrest estate; J. Harris, Blackburn Crescent.

Cradley.—School, Homer Hill (£30,300); J. Harper & Sons, Ltd.

Cumberland.—School, Aspatria, for the County E.C.; J. H. Haughan, county architect, 4, Alfred Street North, Carlisle.

Dorchester.—Houses (48), Victoria Park; borough surveyor.

Durham.—Houses (14), Merry Oaks estate; H. E. Pitt, Ltd., builders, Millfield, Sunderland. Police station and courts, Houghton-le-Spring, for Standing Joint Committee; W. J. Merrett, 20, Old Elvet, Durham. Schools, Springwell and Pittington; county architect, 34, Old Elvet, Durham.

Eastbourne.—Cinema, for Eastbourne News Cinema Co., Trinity Place; V. Jackson. School, Hampden Park, for the E.C.

Ebbw Vale.—Houses, Beaufort Recreation Ground, Beaufort, and Woodville Road, Cwm; surveyor's department, Council Offices, Ebbw Vale.

Ellesmere Port.—Council offices; U.D.C. surveyor.

Evesham.—Extensions to Prince Henry's Grammar school; governors.

Felling-on-Tyne.—Houses (203), Bill Quay, Nest House and Felling House; U.D.C. surveyor.

Folkestone.—Two schools, Harcourt Road (£52,491), for the E.C.

Gateshead-on-Tyne.—Houses (424), Highfield estate; North-Eastern Housing Association, Northumberland Road, Newcastle-on-Tyne. Hotel, Saltwell Road, for Davison & Wood; Hetherington & Wilson, architects, County Chambers, Westgate Road, Newcastle-on-Tyne. Fire station and police station (£20,000), and school, Carr Hill; borough engineer.

Glasgow.—Houses (6,500), Castlemilk estate, for Corporation; architect, housing department. Cinema, Tweedsmuir Road; John McKissack & Son, architects, 65, Renfield Street.

Gravesend.—School, Wrotham Road (£18,500); R. Hopkins & Sons.

Great Yarmouth.—School, North Dene (£16,191); G. Holmes.

Greenock.—Houses (50), Cove Farm, Gourock; West of Scotland Building Co., Ltd.

Hanley.—Houses (70), Kelvin Avenue; J. Kelly.

Hastings.—Factory, Fir Tree Road; Hastings Developments, Ltd.

Hemsworth (NEAR PONTEFRACT).—Houses (40), and bungalows, South Kirby and South Elmsall; W. T. Lynam, engineer and surveyor, Market Chambers, Hemsworth.

Hove.—Baths, café and car park, King's Esplanade (£150,776); G. Percy Trentham, Ltd.

Ireland.—(DUBLIN).—Houses (182), Ellenfield area; H. G. Simms, housing architect, 3, Parliament Street, Dublin.

Kidderminster.—Houses (105), for Cairndhu Estate trustees, Birmingham Road; Gething & Rolley, architects, Kingsley Hall. Extensions to King Charles school (£4,500); governors.

Kirkcaldy.—Business premises (three storeys), for Marks & Spencer, Ltd.; the manager. Cinema, Links Street (£18,000); J. C. Rolland, architect, Kirkcaldy. Ice rink for Kirkcaldy Ice Rink, Ltd. (£37,000); William Williamson & Hubbard, architects, Kirkcaldy.

Lanchester (Co. DURHAM).—Infectious diseases hospital, Mawsfield, for Joint Hospital Board; W. & T. R. Milburn, architects, 17, Fawcett Street, Sunderland.

Leadgate (Co. DURHAM).—Cinema for Consett Cinemas, Ltd.; J. J. Eltringham, architect, Blackhill, Co. Durham.

Leicestershire.—Police quarters, Leicester (£12,000); county architect.

Lichfield.—Houses (40), Stychbrook estate; city engineer.

Llanelly.—Houses (54), Llwynhendy, Tumble and Tycroes; E. Morgan, Council's architect, 63, Murray Street, Llanelly.

London.—(GREENWICH).—Tenements. Thames Street area (£95,000); L.C.C. architect, County Hall, S.E.1. (HACKNEY).—Two schools (£57,000); L.C.C. architect. (ISLINGTON).—Houses, Liverpool Road area (£41,000); L.C.C. architect. (STEPNEY).—Tenements, Rhodeswell Road (£14,643); borough engineer.

Luton.—Houses (534); C. J. Curtis & Co., architects, Carlton House, Regent Street, London, S.W.1.

Marlborough.—Houses (24), Lainey's Close and Cherry Orchard: E. C. Kitchen, borough surveyor, Council Offices, 1, The Green.

Marlow.—Houses (27), Seymour Court Road (£8,833); A. C. Dean, builder, High Wycombe.

Newcastle-on-Tyne.—Additions to factory, Chillingham Road, for Hodgson & Co.; Cackett, Burns Dick & McKellar, architects, 21, Ellison Place.

Northampton.—Houses (120), Thornton Road; T. Wilson & Son, 67, Sheep Street, Northampton.

Norwich.—Stores and workshops (£74,890), Duke Street; A. F. Scott & Sons, architects.

Preston.—Houses (298), Farringdon Park and Thirlmere Road; borough engineer, Municipal Buildings.

Raunds (WELLINGBOROUGH).—Houses (34), Crow Spinney site; G. Whittam, U.D.C. surveyor, Council Offices.

Redcar.—Houses (46); borough engineer.

Reddish.—Houses (905), near Longford Road West; W. Farley, builder, Birch Farm Street, Droylsden.

Richmond (YORKSHIRE).—Houses (56), adjoining Reeth Road; borough surveyor, Frenchgate.

Rothbury.—Houses (36); Hetherington & Wilson, architects, County Chambers, 52, Westgate Road, Newcastle-on-Tyne.

Rotherham.—Houses (18), East Bawtry Road; Saville & Co. Factory, Fitzwilliam Road; C. B. Backer. Schools (£120,000), for the E.C. Extensions to hospital (£42,000); borough engineer.

Royton.—Houses (162), Milton Street site, Mill Street, and Bleasdale Street: U.D.C. surveyor, Town Hall.

Rugby.—Municipal buildings and Benn Memorial Hall (£90,478); E. Prestwich, Bradshawgate Chambers, Leigh, Lancashire.

Runcorn.—Cinema, Greenway Road, for Cheshire County Cinemas, Ltd.

Rushden.—Extensions to factory, Portland Road, for F. Hawkes; A. Sanders, Ltd., Rectory Road.

St. Helens.—Houses (52), Greenbank; borough engineer.

Scarborough.—Baths, Peasholm Gap (£20,346); T. Whitaker & Co., Ltd.

Seaham Harbour.—Houses (209); J. B. Abbey, U.D.C. surveyor.

Sheffield.—Houses (35) and shopping site, Twentywell Lane and Bradway Road; O. E. Hanwell, Twentywell Lane.

Sodbury.—Houses (24), on three sites; H. C. James, R.D.C. housing supervisor, Council Offices, Chipping Sodbury.

Stockton-on-Tees.—Houses (195); borough engineer. Houses, &c. (six acres site), near Kilburn Road; J. C. Watson, builder, Prudential Buildings, Stockton-on-Tees. Houses, near Westerleigh Avenue; P. G. Chambers & Co., builders, Durham Road. Houses (14), Weston Crescent; A. E. Hobbs, builder, Hill House, Norton-on-Tees.

Stoke-on-Trent.—Houses (22), Barnfields; Penkhull Garden Village. Houses (17), Lower Spring Road, Normacot; Higginson & Cope. Houses (28), Weston Coyney Road; Holloway & Co.

Stratford-on-Avon.—Houses (24), Birmingham Road; N. C. Joseph, Ltd., Aluminium works.

Sunderland.—Houses (12), Maywood Road; J. Prentice, builder, 15, St. Nicholas Avenue. Cinema, Durham Road, for Thompson's Enterprises, Ltd. Hotel, Pallion estate, for the Saturn Oxygen Co., Ltd.; J. Huntley & Son, builders, Marion Street. School, Grange site (£50,553), for the E.C.; Randle & Co., Ltd., contractors, Durham Road, Sunderland.

Swansea.—Cinema, Bohun Street; Manor Cinema, Ltd. Cinema, Main Road, Mumbles; T. E. Merrells.

Swindon.—Houses (34), Bowood Road; E. H. Bradley & Sons.

Tintwistle.—Houses (20), Speedwell Farm site; Crompton Bros., contractors, 44, Stockport Road, Hyde.

Wellington (SOMERSET).—Houses (28), Hartswell; W. White & Sons, builders, Golden Hill, Wiveliscombe.

Wembley.—Theatre, shops and flats, Ealing Road, for Wembley Halls, Ltd.; C. W. Glover & Partners, architects, Shell Mex House, Strand, London, W.C.2.

Wenlock (SHROPSHIRE).—Houses, Dark Lane, Broseley and the Bank, Stretton Road; A. J. Benberthy, architect, 74, Bath Road, Wolverhampton.

Whitby (YORKSHIRE).—Houses (30); Ball, Thomas & Lister, contractors

Wigton.—Houses (98), Brindle Field (£41,421), for North Eastern Housing Association, Ltd.; Thomas Armstrong, Ltd., contractors, Workington and Cockermouth.

Wolverhampton.—Houses (27), Bhylls Farm estate; Silcostyle Estates, Ltd. Houses (20), Green Lane; W. Winsper. Houses (54), Northfield Grove; W. Vaughan. Houses (14), Oxley Moor Road; E. A. Colman. Houses (100), Rake Gate Farm estate; A. M. Griffiths & Co., Ltd. School, Codsall; education architect, Education Offices, Stafford.

Worcestershire.—Schools, Hagley, Lickey, Redditch, and Stourport, also extensions to High School, Oldbury, for the County E.C.

Worthing.—Houses (28), Sompting (£11,176); D. A. Hopper, builder, Worthing.

Street Lighting

An address which was delivered at recent E.D.A.-E.L.M.A. street lighting conferences at Edinburgh and Glasgow by Mr. R. Maxted and repeated at Belfast by Mr. T. Catten (both of the B.T.H. Co.) first explained how visibility was improved when conditions were such as to reveal objects as dark silhouettes. Good illumination must therefore render bright all surfaces that might at any time form an important background. The lecturers next examined the recommendations of the Ministry of Transport Report, commenting upon certain aspects and requirements.